247 Parkdale Avenue Mixed-Use Development
Ottawa, Ontario

• COMMUNITY TRANSPORTATION STUDY / TRANSPORTATION IMPACT STUDY •

June 20, 2013

Delcan 60th ANNIVERSARY

CTS/TIS Check List

prepared for: Richraft Group of Companies
2280 St. Laurent Boulevard
Ottawa, ON K1G 4K1

OUR REF:TO1170TOP00

Report Context

- ☑ Municipal address;
  No inclusion rational: _____
- ☑ Location relative to major elements of the existing transportation system (e.g., the site is located in the southwest quadrant of the intersection of Main Street/ First Street, 600metres from the Maple Street Rapid Transit Station);
  No inclusion rational: _____
- ☑ Existing land uses or permitted use provisions in the Official Plan, Zoning By-law, etc.;
  No inclusion rational: _____
- ☑ Proposed land uses and relevant planning regulations to be used in the analysis;
  No inclusion rational: _____
- ☑ Proposed development size (building size, number of residential units, etc.) and location on site;
  No inclusion rational: _____
- ☑ Estimated date of occupancy;
  No inclusion rational: _____
- ☑ Planned phasing of development;
  No inclusion rational: _____
- ☑ Proposed number of parking spaces (not relevant for Draft Plans of Subdivision);
  No inclusion rational: _____
- ☑ Proposed access points and type of access (full turns, right-in/ right-out, turning restrictions, etc.
  No inclusion rational: _____
- ☑ Study area;
  No inclusion rational: _____

Existing Conditions

- ☑ Existing roads and ramps in the study area, including jurisdiction, classification, number of lanes, and posted speed limit;

  No inclusion rational: _____

- ☑ Existing intersections, indicating type of control, lane configurations, turning restrictions, and any other relevant data (e.g., extraordinary lane widths, grades, etc.);

  No inclusion rational: _____

- ☑ Existing access points to adjacent developments (both sides of all roads bordering the site);

  No inclusion rational: _____

- ☑ Existing transit system, including stations and stops;

  No inclusion rational: _____

- ☑ Existing on- and off-road bicycle facilities and pedestrian sidewalks and pathway networks;

  No inclusion rational: _____

- ☑ Existing system operations (V/C, LOS);

  No inclusion rational: _____

- ☑ Major trip generators/ attractors within the Study Area should be indicated.

  No inclusion rational: _____

Demand Forecasting

- ☑ General background growth;

  No inclusion rational: _____

- ☑ Other study area developments;

  No inclusion rational: _____

- ☑ Changes to the study area road network;

  No inclusion rational: _____

- ☑ Future background system operations (V/C, LOS, queue lengths):

  No inclusion rational: _____

- ☑ Trip generation rates;

  No inclusion rational: _____

- ☑ Trip distribution and assignment.

  No inclusion rational: _____

Impact Analysis

- ☑ Total future system operations (V/C, LOS, queue lengths);

  No inclusion rational: _____

- ☑ Signal and auxiliary lane (device) warrants;

  No inclusion rational: _____

- ☑ Operational/ safety assessment (e.g., sight line assessment where grades are an issue);

  No inclusion rational: _____

- ☑ Storage analysis for closely spaced intersections;

  No inclusion rational: _____

- ☑ Pedestrian and bicycle network connections and continuity;

  No inclusion rational: _____

- ☑ On-site circulation and design;

  No inclusion rational: _____

- ☑ Potential for neighbourhood impacts; and TDM.

  No inclusion rational: _____

- ☑ Synchro Files

  No inclusion rational: _____

CTS

Impact Analysis

- ☑ Network Capacity Analysis;

  No inclusion rational: _____

- ☑ Non-auto network connections and continuity;

  No inclusion rational: _____

- ☑ Potential for community impacts, and TDM.

  No inclusion rational: _____

- ☑ Synchro Files

  No inclusion rational: _____

- ☑ Screenline Analysis

  No inclusion rational: _____

274 Parkdale Avenue
Mixed-Use Development

Community Transportation Study/
Transportation Impact Study

prepared for:
Richcraft Group of Companies
2280 St. Laurent Boulevard
Ottawa, ON K1G 4K1

prepared by:

1223 Michael Street
Suite 100
Ottawa, ON K1J 7T2

June 20, 2013

TO1170TOP00

Table of Contents

List of Figures

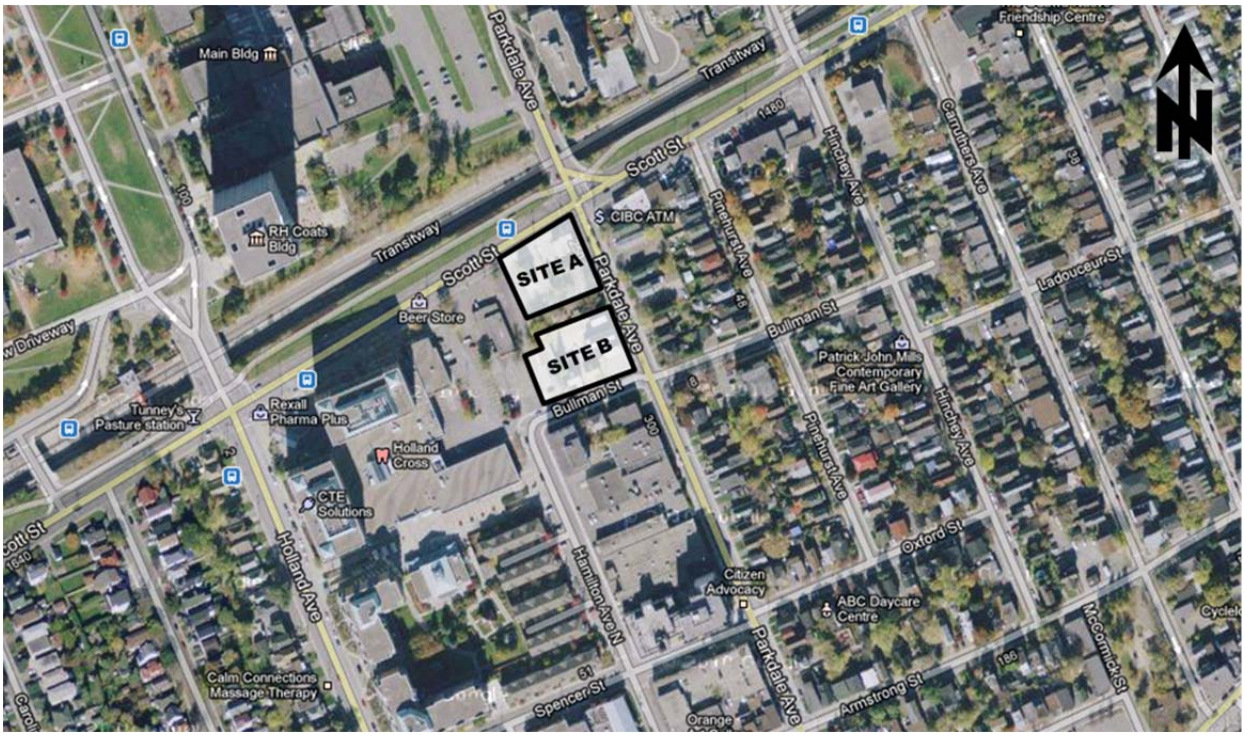
List of Tables

Appendices

1. INTRODUCTION

From the information provided, a mixed-use development consisting of two towers of 32 and 28 storeys in height, containing approximately 500 residential dwelling units, 15,963 ft^2 of retail and 22,712 ft^2 of office type land uses is being proposed on the properties municipally known as 250 to 274 Parkdale Avenue and 9 to 13 Bullman Street. The proposed site is located within the southwest quadrant of the Scott/Parkdale intersection, which is currently occupied by residential and restaurant land uses. The local context of the site is provided as Figure 1 and the proposed Preliminary Site Plan is provided as Figure 2.

Figure 1: Local Context



As part of the Site Plan Approval process, the City of Ottawa requires a submission of a formal Transportation Impact Assessment (TIA) consistent with their guidelines dated October 2006. With respect to these guidelines and for this level of development, a joint Community Transportation Study/Transportation Impact Study (CTS/TIS) is considered the appropriate type of study.

At the pre-consultation meeting, it was agreed with City Staff that the signalized and unsignalized intersections of Scott/Parkdale, Scott/Holland, Parkdale/Bullman, Parkdale/Armstrong, and Parkdale/Wellington should be assessed. Each site will be accessed by a full-movement driveway connection, one to Scott Street and one to Bullman Street (depicted in Figure 2), and both will be assessed in the subsequent analysis.

TOWER 'A'
250 PARKDALE AVENUE

PROJECT INFORMATION

ZONING	Zoning By-Law 2008-250	MC12 F(2.0) H(19)
SITE AREA		1,156.57 sq. m. (12,449 sq. ft.)

PROJECT STATISTICS

FLOOR SPACE INDEX	14,304.8 sq. m. (153,976) sq. ft.	12.6
BUILDING HEIGHT TOWER 'A'		103.0 M
LANDSCAPE AREA	301.7 sq. m. (3,247) sq. ft.	26%
AMENITY SPACE	PRIVATE =	1,748 sq. m.
	COMMUNAL =	650 sq. m.
	TOTAL =	2,398 sq. m.

GROSS BUILDING - AREAS
(CITY OF OTTAWA'S DEFINITION)

PARKING LEVEL (TYPICAL)		
GROUND FLOOR		835.0 sq. m. (2,581) sq. ft.
2nd & 3rd FLOOR	2 x 636.6 sq. m. 2 x (6,852) sq. ft.	1,273.2 sq. m. (13,704) sq. ft.
4th FLOOR		525.9 sq. m. (5,661) sq. ft.
TYPICAL FL. (SQUARE)	7 x 382.5 sq. m. 7 x (4,117) sq. ft.	2,677.4 sq. m. (28,819) sq. ft.
TYPICAL FL. (ANGLED)	20 x 430.54 sq. m. 20 x (4,634) sq. ft.	8,610.8 sq. m. (92,686) sq. ft.
PENTHOUSE FLOOR (32)		382.5 sq. m. (4,117) sq. ft.
TOTAL AREA (ABOVE GRADE)		14,304.8 sq. m. (153,976) sq. ft.

UNIT STATISTICS

1 BEDROOM UNIT	124
2 BEDROOM UNIT	84
TOTAL	208
COMMERCIAL RETAIL	239.9 sq. m. (2,582) sq. ft.
COMMERCIAL OFFICE	2,110 sq. m. (22,713) sq. ft.

CAR PARKING

REQUIRED		
RESIDENCE	- 0.5 PER UNIT (208 UNITS)	104
VISITOR	- 0.2 PER DWELLING UNIT (AFTER 12 UNITS)	39
COMMERCIAL RETAIL	- 2.5 PER 100m² OF G.F.A.	6
COMMERCIAL OFFICE	- 1.8 PER 100m² OF G.F.A.	38
TOTAL		187
PROVIDED		
RESIDENCE	- 0.7 PER UNIT (208 UNITS)	146
VISITOR	- 0.20 PER DWELLING UNIT	
COMMERCIAL RETAIL	- 2.5 PER 100m² OF G.F.A.	
COMMERCIAL OFFICE	- 2.5 PER 100m² OF G.F.A. (VISITOR / COMMERCIAL - SHARED)	44
TOTAL		190

BICYCLE PARKING

REQUIRED		
RESIDENCE	- 0.5 PER UNIT (208 UNITS)	104
COMMERCIAL RETAIL	- 1.0 PER 250m² OF G.F.A.	1
COMMERCIAL OFFICE	- 1.0 PER 250m² OF G.F.A.	9
TOTAL		114
PROVIDED		
UNDERGROUND		120

TOWER 'B'
274 PARKDALE AVENUE

PROJECT INFORMATION

ZONING	Zoning By-Law 2008-250	MC12 F(2.0) H(19)
SITE AREA		2,400.0 sq. m. (25,833 sq. ft.)

PROJECT STATISTICS

FLOOR SPACE INDEX	18,702.4 sq. m. (201,311) sq. ft.	8.0
BUILDING HEIGHT TOWER 'B'		91.0 M
LANDSCAPE AREA	397.85 sq. m. (4,282) sq. ft.	16.6%
AMENITY SPACE	PRIVATE =	2,200 sq. m.
	COMMUNAL =	980 sq. m.
	TOTAL =	3,180 sq. m.

GROSS BUILDING - AREAS
(CITY OF OTTAWA'S DEFINITION)

PARKING LEVEL (TYPICAL)		
GROUND FLOOR		1,243.1 sq. m. (13,381) sq. ft.
2nd & 3rd FLOOR	2 x 1,411.2 sq. m. 2 x (15,190) sq. ft.	2,822.4 sq. m. (30,380) sq. ft.
4th FLOOR		1,249.1 sq. m. (13,445) sq. ft.
TYPICAL FLOOR (5th - 27th)	23 x 563.2 sq. m. 23 x (6,062) sq. ft.	12,953.6 sq. m. (139,426) sq. ft.
PENTHOUSE FLOOR (28)		434.2 sq. m. (4,674) sq. ft.
TOTAL AREA (ABOVE GRADE)		18,702.4 sq. m. (201,311) sq. ft.

UNIT STATISTICS

1 BEDROOM UNIT	
2 BEDROOM UNIT	
TOTAL	291
COMMERCIAL FOOD RETAIL	1,243.1 sq. m. (13,381) sq. ft.

CAR PARKING

REQUIRED		
RESIDENCE	- 0.5 PER UNIT (291 UNITS)	146
VISITOR	- 0.2 PER DWELLING UNIT (AFTER 12 UNITS)	56
COMMERCIAL RETAIL	- 2.5 PER 100m² OF G.F.A.	31
TOTAL		233
PROVIDED		
RESIDENCE	- 0.7 PER UNIT (291 UNITS)	104
VISITOR	- 0.20 PER DWELLING UNIT	
COMMERCIAL RETAIL	- 2.5 PER 100m² OF G.F.A. (VISITOR / COMMERCIAL - SHARED)	56
TOTAL		260

BICYCLE PARKING

REQUIRED		
RESIDENCE	- 0.5 PER UNIT (291 UNITS)	146
COMMERCIAL RETAIL	- 1.0 PER 250m² OF G.F.A.	5
TOTAL		151
PROVIDED		
UNDERGROUND		160

RODERICKLAHEY ARCHITECT INC

ISSUED FOR ZONING AMENDMENT

PLOT DATE: Tuesday, April 16, 2013

ONTARIO ASSOCIATION OF ARCHITECTS — RODERICK LAHEY LICENCE 4375

250 & 274 PARKDALE AVENUE
OTTAWA ONTARIO

RICHCRAFT™ Group Of Companies

Delcan

Figure 2: Proposed Site Plan

For the purpose of this assessment, full build-out/full occupancy is assumed to be the year 2015. With respect to the City's TIA guidelines, analysing future conditions 5-years beyond full build-out is not included herein, given the following:

- The proposed development is located within an area with an established transportation network;
- The immediate study area road network has experienced negative overall growth in traffic volumes in recent years (see Section 3.3);
- With the planned opening of the LRT system (and the adjacent Tunney's Pasture Station) in 2018, there will be changes in transit modal splits for the existing study area;
- There is significant redevelopment growth planned for the immediate area, which has no current time table and therefore, projecting traffic volumes beyond 2015 is somewhat arbitrary. This planned growth includes; the doubling of Tunney's Pasture employment from 10,000 to 20,000 employees, the planned development of residential condo projects at 233 Armstrong (Attika), 12 Stirling and one or two new developments on the east side of Parkdale Avenue (north of Scott Street), and other redevelopment opportunities that will arise out of the ongoing Scott Street Community Design Plan study.

Given the foregoing, and as key study area intersections are already at or close to capacity, the approach used herein is to assume a 10% growth in background traffic to the build-out horizon year 2015 only.

2. EXISTING CONDITIONS

2.1 Area Road Network

Scott Street is an east-west arterial, which extends from Churchill Avenue in the west to Bayview Road in the east, where it continues as Albert Street. Within the study area, the cross section of Scott Street consists of two travel lanes in each direction and auxiliary turn lanes are provided at major intersections. The posted speed limit within the study area is 50 km/h.

Parkdale Avenue is a north-south arterial, which extends from Carling Avenue in the south to Sir John A. Macdonald Parkway in the north. Within the study area, the cross section of Parkdale Avenue consists of a single travel lane in each direction with on-street parking provided along the west side of the road. Auxiliary turn lanes are provided at major intersections and the posted speed limit is 50 km/h.

Wellington Street West is an east-west arterial, which extends from Breezehill Avenue in the east to Island Park Drive in the west, where it continues as Richmond Road. Within the study area, the cross section of Wellington Street consists of a single travel lane in each direction with on-street parking provided along both sides of the road. Auxiliary turn lanes are provided at major intersections and the unposted speed limit is understood to be 50 km/h.

Holland Avenue is a major collector roadway. The cross section of Holland Avenue consists of a single travel lane in each direction with on-street parking provided along both sides of the road. Auxiliary turn lanes are provided at major intersections and the unposted speed limit is understood to be 50 km/h.

Armstrong Avenue and Bullman Street are local roadways with unposted speed limits of 50 km/h. Within the study area, the cross section of Armstrong Avenue and Bullman Street consist of a single travel lane in each direction.

2.2 Pedestrian/Cycling Network

Sidewalk facilities in the vicinity of the site are provided along both sides of all study area roads. An off-road multi-use pathway is currently provided along the north side of Scott Street.

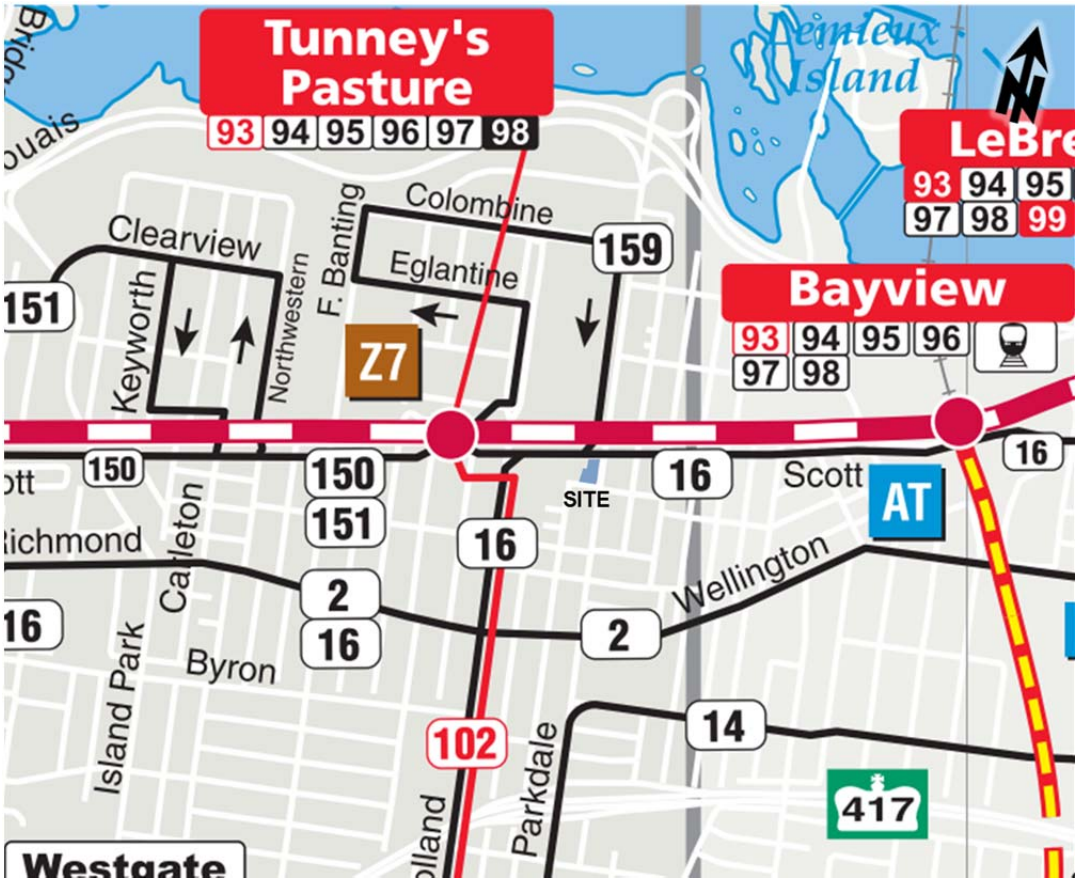
According to the City's 2008 Official Cycling Plan (OCP), Scott Street, Holland Avenue, and Wellington Street are classified as "spine or City-wide" cycling routes and Armstrong Avenue is classified as a community cycling route. Bicycle lanes are proposed along Scott Street by 2018-2028 with shared-use lanes proposed along Holland Avenue, Wellington Street and Armstrong Avenue by 2018.

2.3 Transit Network

Transit service within the vicinity of the site is currently provided by OC Transpo Regular Routes #2, 16, 86, 159 and 176, which provide frequent all-day service, and by Peak Hour Route #102. Bus stops for Routes #16 and 159 are located along Scott Street adjacent to the proposed development. Bus stops for Routes #86, 102 and 176 are located along Holland Avenue approximately 250 metres west of the proposed development. Bus stops for Route #2 are located along Wellington Street approximately 350 m south of the proposed development.

Rapid transit service is also provided within the vicinity of the site via the Tunney's Pasture Transitway Station. Located approximately 300 metres west of the proposed development, the Tunney's Pasture Transitway Station provides convenient access to rapid transit routes along the Transitway.

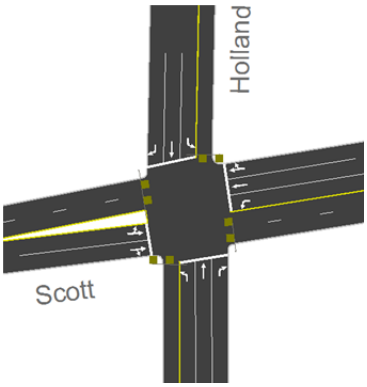
Figure 3: Area Transit Network



2.4 Existing Study Area Intersections

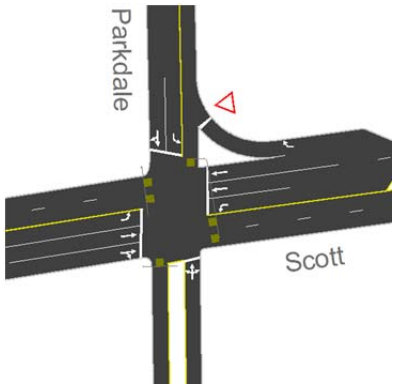
Scott / Holland

The Scott/Holland intersection is an signalized four-legged intersection. The westbound approach consists of a left-turn lane, a through lane and a shared through/right-turn lane. The eastbound approach consists of a shared through/left-turn lane and a shared through/right-turn lane. The north and southbound approaches consist of single left-turn lanes, single through lanes and single right-turn lanes. All movements are permitted at this location.



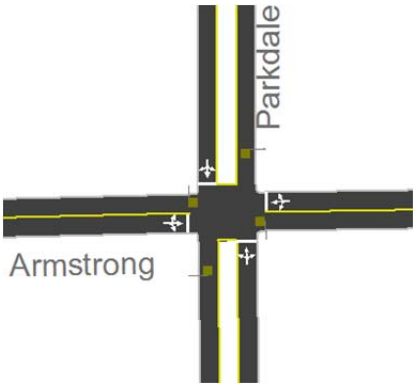
Parkdale / Scott

The Parkdale/Scott intersection is a signalized four-legged intersection. The westbound approach consists of a single left-turn lane, two through lanes and a single channelized right-turn lane. The eastbound approach consists of a single left-turn lane, a through lane and a shared through/right-turn lane. The southbound approach consists of a single left-turn lane and a shared through/right-turn lane. The northbound approach consists of a single full-movement lane. All movements are permitted at this location.



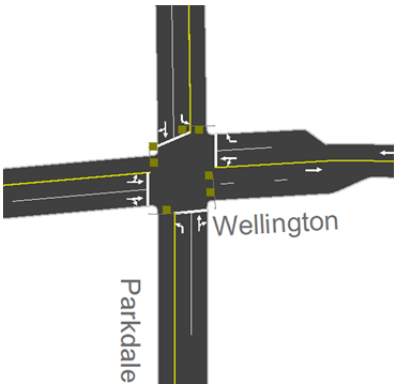
Parkdale / Armstrong

The Parkdale/Armstrong intersection is a signalized four-legged intersection. All four approaches consist of a single full-movement lane and all movements are permitted at this location.



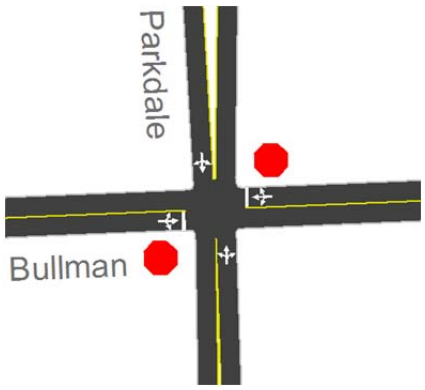
Parkdale / Wellington

The Parkdale/Wellington intersection is a signalized four-legged intersection. The westbound approach consists of shared through/left-turn lane and a single right-turn lane. The eastbound approach consists of a shared through/left-turn lane and a shared through/right-turn lane. The north and southbound approaches consist of single left-turn lanes and shared through/right-turn lanes. All movements are permitted at this location, however, at all four approaches right-turns-on-red are not permitted between 7AM – 7PM, Monday - Friday.



Parkdale/Bullman

The Parkdale/Bullman intersection is an unsignalized four-legged intersection with STOP control on the minor approach (Bullman Street) only. All four approaches consist of a single full movement lane and all movements are permitted at this location.



2.5 Existing Intersection Operations

Illustrated as Figure 4, are the most recent weekday morning and afternoon peak hour traffic volumes obtained from the City of Ottawa for the Scott/Parkdale, Scott/Holland, Parkdale/Armstrong, and Parkdale/Wellington intersections. Existing weekday morning and afternoon peak hour traffic volumes, also illustrated in Figure 4, were collected by Delcan at the Parkdale/Bullman intersection. These peak hour traffic volumes are included as Appendix A.

The following Table 1 provides a summary of existing traffic operations at study area intersections based on the SYNCHRO (V8) traffic analysis software. The subject intersections were assessed in terms of the volume-to-capacity (v/c) ratio and the corresponding Level of Service (LoS) for the critical movement(s). The subject intersections 'as a whole' were assessed based on a weighted v/c ratio and the Synchro model output of existing conditions is provided within Appendix B.

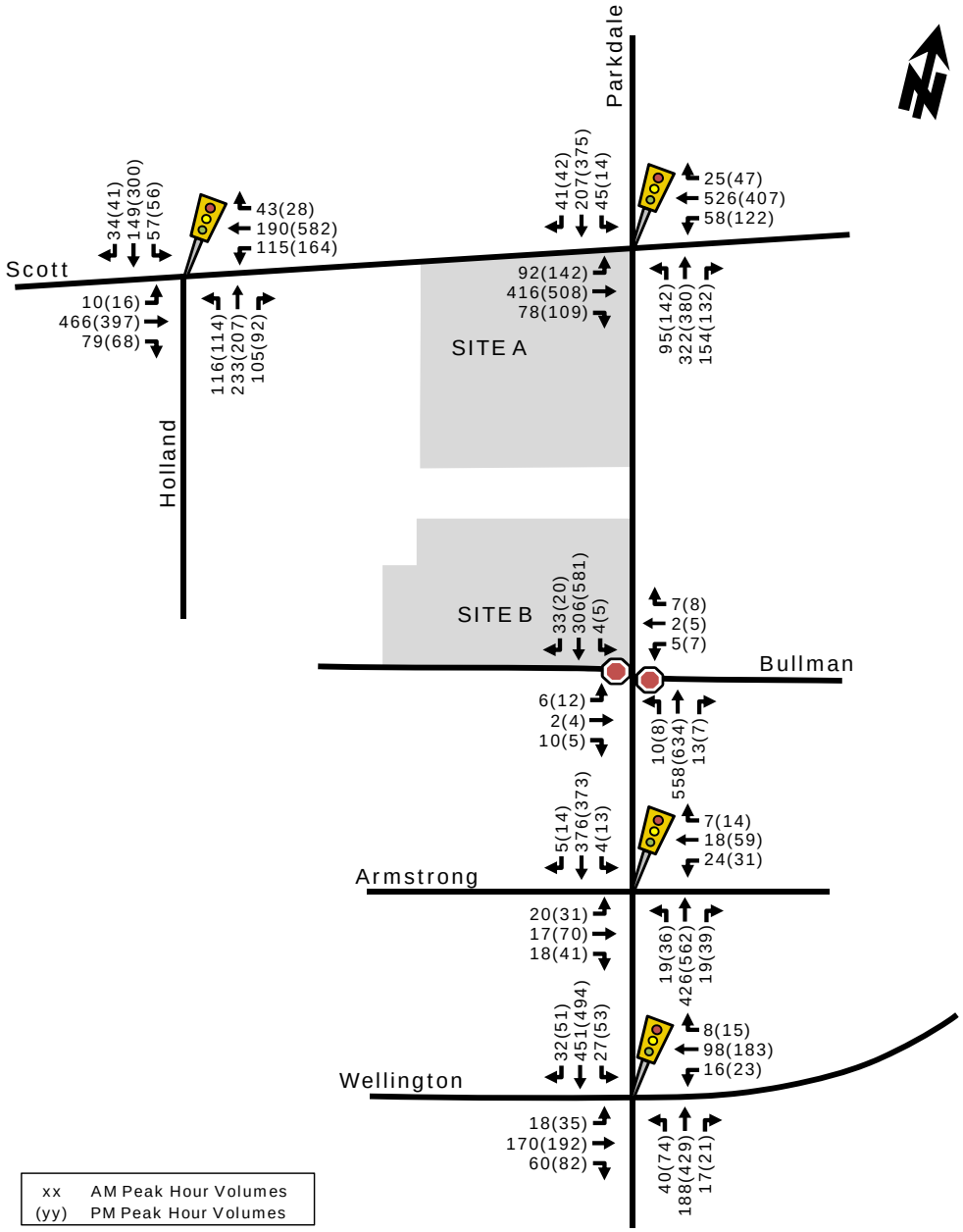
Table 1: Existing Performance at Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	'Critical Movement'			'Intersection as a Whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Scott/Parkdale	F(F)	1.15(1.39)	NBT(NBT)	44.2(77.0)	C(E)	0.72(0.95)
Scott/Holland	B(D)	0.69(0.88)	NBT(NBL)	18.6(21.0)	A(A)	0.40(0.50)
Parkdale/Bullman	B(C)	14.9(17.4)	WBT(EBT)	0.7(0.7)	-	-
Parkdale/Armstrong	A(B)	0.41(0.66)	NBT(NBT)	9.8(17.0)	A(A)	0.35(0.51)
Parkdale/Wellington	D(D)	0.86(0.88)	SBT(SBT)	31.8(28.8)	B(B)	0.63(0.70)

Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.

As shown in Table 1, with the exception of the Scott/Parkdale intersection during the afternoon peak hour, the signalized study area intersections, 'as a whole', are currently operating at an acceptable LoS 'C' or better during both peak hours, with respect to the City of Ottawa operating standards of LoS 'D' or better (*0.90 > v/c > 0.00*). The Scott/Parkdale intersection is currently operating at capacity (LoS 'E') during the afternoon peak hour.

Figure 4: Existing Peak Hour Traffic Volumes



With regard to 'critical movements' at study area intersections, the northbound through movement at the Scott/Parkdale intersection is currently failing with a LoS 'F' during both weekday morning and afternoon peak hours. All other 'critical movements' at study area intersections are currently operating at an acceptable LoS 'D' or better during peak hours.

Peak hour field observations at study area intersections confirm these findings. However, based on 6 independent peak hour observations, notable queues were observed on (or approaching) Parkdale Avenue at (or through) the signalized Scott/Parkdale and Parkdale/Wellington intersections. The following is a summary of key observations.

Observation 1
May 14, 2013 - afternoon peak period

Scott/Parkdale

- The northbound through movement generated an approximate 60 m queue that was processed every signal cycle.
- The westbound left-turn movement generated an approximate 70 m queue that was processed every one or two cycles.

The northbound through queue was often caused by one or two northbound left-turning vehicles waiting for an acceptable gap to complete their left-turn. Given there is currently no auxiliary northbound left-turn lane, through traffic can occasionally be blocked by these left-turning vehicles.

Parkdale/Wellington

- A queue in the southbound direction extended from HWY 417 to Wellington Street.

Observation 2
May 15, 2013 - morning peak period

Scott/Parkdale

- The northbound through movement generated an approximate 60 m queue that was processed every signal cycle.

Same as with Observation 1, the northbound through queue was often caused by one or two northbound left-turning vehicles.

Parkdale/Wellington

- A queue in the southbound direction extended from HWY 417 to approximately 80 m north of Wellington Street. This queue typically cleared on its respective green phase at the Parkdale/Wellington intersection.

Observation 3
May 27, 2013 - morning peak period

The same was observed as Observation 2.

Observation 4
May 27, 2013 - afternoon peak period

Scott/Parkdale

- A queue in the northbound direction from Scott Street extended to approximately Gladstone Avenue.

Parkdale/Wellington

- A queue in the southbound direction extended from HWY 417 to approximately 180 m north of Wellington Street (just past Armstrong Street). This queue typically required one or two signal cycles to clear.

Observation 5
May 28, 2013 - morning peak period

Scott/Parkdale

- The northbound through movement generated an approximate 300 m queue (just past Spencer Street) that required one or two signal cycles to be processed.

Parkdale/Wellington

- A queue in the southbound direction extended from HWY 417 to approximately 180 m north of Wellington Street (just past Armstrong Street). This queue typically required one or two signal cycles to clear.

Observation 6
May 28, 2013 - afternoon peak period

Scott/Parkdale

- A queue in the northbound direction extended through the Scott/Parkdale intersection from approximately Burnside Avenue in the north to HWY 417.

Parkdale/Wellington

- A queue in the southbound direction extended from HWY 417 to approximately 180 m north of Wellington Street (just past Armstrong Street). This queue typically required one or two signal cycles to clear Wellington Street.

Based on these 6 independent observations, the amount of traffic congestion on Parkdale Avenue can fluctuate significantly day-by-day. There are days where Parkdale Avenue experiences very little queuing and operates very well (within the study area) and there are days where it experiences heavy queues for hours. It was also observed that traffic congestion on Parkdale Avenue can rapidly transition (within the study area) from no queues, to significant queues and back to no queues, in a span of 30 minutes.

In conclusion, the amount of traffic congestion on Parkdale Avenue (within the study area) is greatly dependant on how HWY 417 and the Sir John A. Macdonald Parkway are operating. If HWY 417 is heavily congested, drivers will exit at Parkdale Avenue, travel north to the Sir John A. Macdonald Parkway as an alternate east/west route, and similarly vice versa, if the Sir John A. Macdonald Parkway is heavily congested.

2.6 Existing Road Safety Conditions

Collision history for study area roads (2009 to 2011, inclusive) was obtained from the City of Ottawa, which reveal that most collisions (72%) involved only property damage, indicating low impact speeds and 26% involved personal injuries. The remaining 1% were identified as "non-reportable", indicating the total damage to a vehicle was less than $1,000.

The primary causes of collisions cited by police include rear end (29%), angle (22%), turning movement (20%), and sideswipe (14%) type collisions.

A standard unit of measure for assessing collisions at an intersection is based on the number of collisions per million entering vehicles (MEV). At intersections within the study area, reported collisions have historically taken place at a rate of:

- 0.88/MEV at the Scott/Parkdale intersection;
- 0.85/MEV at the Scott/Holland intersection;
- 0.91/MEV at the Parkdale/Armstrong intersection; and
- 0.76/MEV at the Parkdale/Wellington intersection.

Based on the available data, there does not appear to be any prevailing safety issues. The roadways within the study area are noted as being relatively straight and level, resulting in good sight-lines/visibility and vehicle traction. The source collision data as provided by the City of Ottawa and related analysis is included as Appendix C.

3. DEMAND FORECASTING

3.1 Planned Study Area Transportation Network Changes

Within the study area, a notable transportation network change includes the implementation of Light Rail Transit (LRT) in place of the existing Bus Rapid Transit (BRT). According to the City's Transportation Master Plan (TMP), to be completed as a Phase 1 City Project, the existing Transitway will be converted to LRT with a station located within the vicinity of the site at the existing Tunney's Pasture Transit Station. The expected completion date for the conversion is 2018.

3.2 Other Area Development

With respect to other area development, the following development applications have been submitted to the City of Ottawa in the vicinity of the proposed site:

99-107 Parkdale Avenue
Urbandale Construction is proposing the construction of a 28 storey condominium building at the above noted address, which is located approximately 450 m north of the subject site. The Transportation Study (prepared by J.L. Richards & Associates) reported a projected increase in two-way traffic of 42 and 48 veh/h during the weekday morning and afternoon peak hours, respectively.

159 – 167 Parkdale Avenue
Richcraft is proposing to redevelop the property at the above noted address, which is currently occupied by low density housing. The proposed new development will consist of high-rise condominiums and is located approximately 200 m north of the subject site. The Transportation Study (prepared by Delcan) reported a projected increase in two-way traffic of 46 and 44 veh/h during the weekday morning and afternoon peak hours, respectively.

111 – 121 Parkdale Avenue
A high-rise condominium building is being proposed at the above noted address which is located approximately 450 m north of the subject site. The Transportation Study (prepared by Stantec) reported a projected increase in two-way traffic of 122 and 81 veh/h during the weekday morning and afternoon peak hours, respectively.

1000 Wellington Street West
Windmill Development Group is proposing the construction of a high-rise condominium building with ground floor retail at the above noted address, which is located approximately 700 m southeast of the subject site. The Transportation Study (prepared by Delcan) reported a projected increase in two-way traffic of 41 and 42 veh/h during the weekday morning and afternoon peak hours, respectively.

233 Armstrong Avenue – "Attika" at Parkdale Market
TEGA Developments is proposing the construction of a mixed-use development at the above noted address, which is located approximately 350 m south of the subject site. The most recent addendum to the transportation study (prepared by Delcan) projected 108 veh/h and 124 veh/h in the morning and afternoon peak hours, respectively.

12 Stirling Avenue
A high-rise condominium building with ground floor retail is being proposed at the above noted address, which is located approximately 250 m east of the subject site. The Transportation Study (prepared by Delcan) reported a projected increase in two-way traffic of 61 and 79 veh/h during the weekday morning and afternoon peak hours, respectively.

1451 – 1445 Wellington Street West
A high-rise condominium building is being proposed at the above noted address which is located approximately 1 km west of the subject site. The Transportation Study (prepared by Delcan) reported a projected increase in two-way traffic of 46 and 41 veh/h during the weekday morning and afternoon peak hours, respectively.

Tunney's Pasture Master Plan
Recommended in the Tunney's Pasture Master Plan Transportation Overview (prepared by Delcan) are signalized intersections at the Scott/Ross and Parkdale/Columbine intersections, which are located approximately 700 m west and 500 m north of the subject site, respectively. In addition, it is recommended that Parkdale Avenue be widened to a four lane divided roadway north of the Parkdale/Columbine intersection.

3.3 Background Traffic Growth

The following background traffic growth through the immediate study area (summarized in Table 2) was calculated based on historical traffic count data (years 2003, 2007, 2008 and 2011) provided by the City of Ottawa at the Scott/Parkdale intersection. Detailed analysis is included as Appendix D.

Table 2: Parkdale/Scott Historical Background Growth (2003 – 2011)

Time Period	Percent Annual Change				
	North Leg	South Leg	East Leg	West Leg	Overall
8 hrs	-2.06%	2.49%	-0.19%	-0.59%	**-0.07%**
AM Peak	-3.64%	1.55%	-0.62%	-0.22%	**-0.60%**
PM Peak	-4.76%	1.53%	-1.25%	-1.88%	**-1.54%**

As show in Table 2, the Scott/Parkdale intersection has experienced no overall growth (calculated as a weighted average) within recent years. However, to account for the traffic generated by the previously identified area development in the vicinity of the site, a 10% growth factor was applied to existing traffic volumes along Scott Street, Parkdale Avenue and Wellington Street West. The resultant 2015 background traffic is depicted as Figure 5.

3.4 Screenline Analysis

The most relevant screenlines (SL) that surround the study area include SL 2, 24, 25, 27 and 29. The existing performance of each screenline is summarized below in Table 3.

Table 3: Existing Screenline Performance

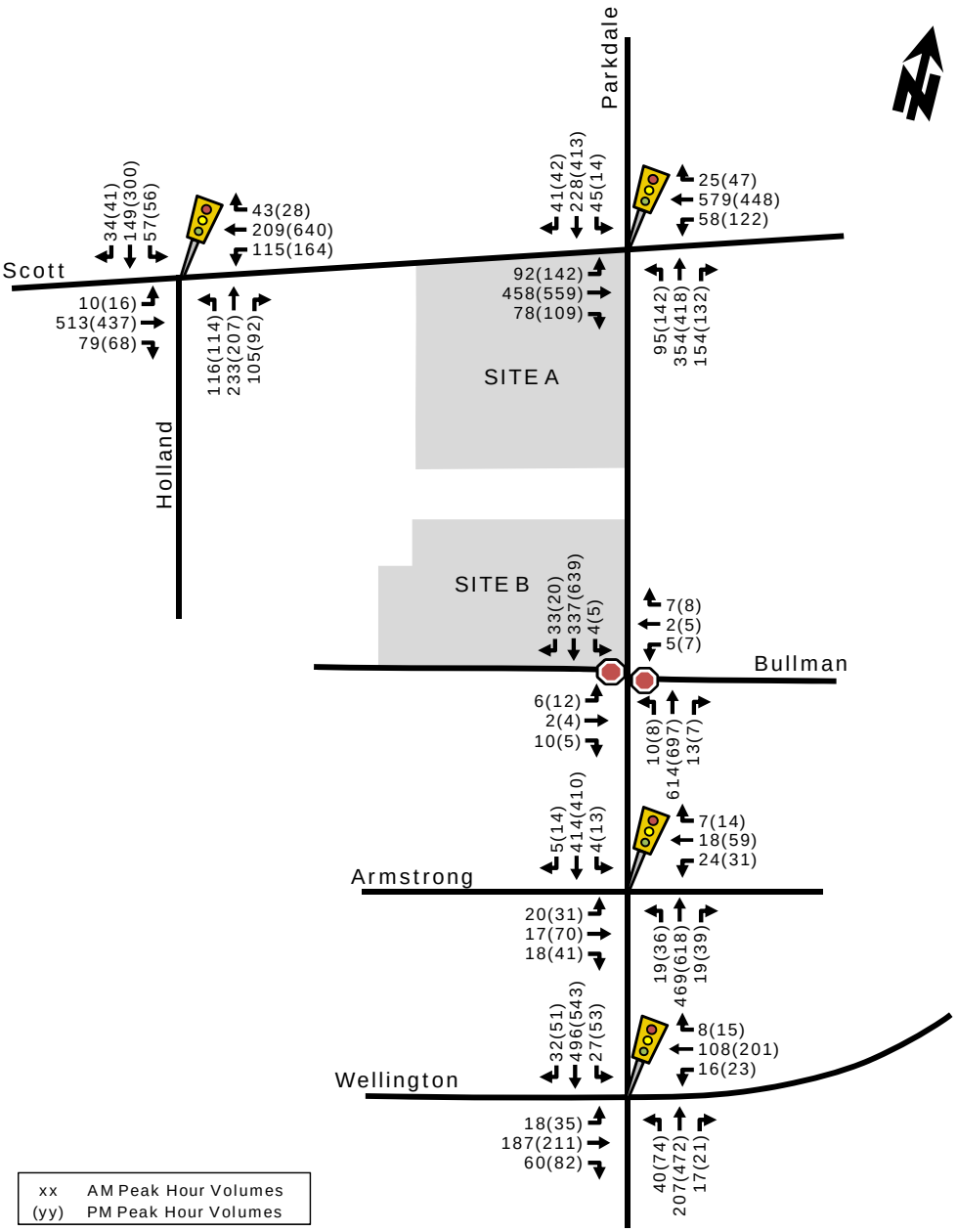
Screenline	Peak Directional Demand[1] (PCU)[2]	Directional Capacity[3] (PCU)	v/c
2 (Champlain Bridge)	2,500	1,500	1.67
24/25 (Western Parkway)	13,300	16,300	0.82
27/29 (CPR Line)	9,800	9,000	1.09

1. 2010 volumes obtained from the City of Ottawa
2. PCU (Passenger Car Units) were assumed to be the sum of autos and 2 x heavy vehicles
3. Directional capacities were obtained from the City's 2008 Transportation Master Plan – Road Infrastructure needs Study

As shown in Table 3, SL 24/25 is currently operating acceptably (LoS 'D'), while SL 2 and SL 27/29 are currently failing (LoS 'F') during peak hours. With the construction of the new interprovincial crossing over the Ottawa River and the City's east-west Light Rail Transit (LRT) will have the potential to relieve the existing congestion along SL 2 and SL 27/29.

Based on the foregoing SL assessment, the proposed development does not require any major road network improvements beyond those already identified with the City's TMP.

Figure 5: Projected 2015 Background Traffic Volumes



3.5 Site Trip Generation

Appropriate trip generation rates for the proposed development consisting of approximately 500 residential dwelling units, 15,963 ft^2 of retail and 22,713 ft^2 of office land uses were obtained from the 9th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual, which are summarized in Table 3.

Table 4: ITE Trip Generation Rates

Land Use	Data Source	Trip Rates	
		AM Peak	PM Peak
Condominiums	ITE 232	T = 0.34(du); T = 0.29(du) + 28.86	T = 0.38(du); T = 0.34(du) + 15.47
Specialty Retail Centre[1]	ITE 826	T = 1.36(X); T = 1.20(X) + 10.74	T = 2.71(X); T = 2.40(X) + 21.48
Office	ITE 720	T = 0.53(X);	T = 1.06(X);

Notes: T = Average Vehicle Trip Ends
X = 1,000 ft^2 Gross Floor Area
du = dwelling units
1. Specialty Retail AM Peak is assumed to be 50% of the PM Peak

As ITE trip generation surveys only record vehicle trips and typically reflect highly suburban locations (with little to no access by travel modes other than private automobiles), adjustment factors appropriate to the more urban study area context were applied to attain estimates of person trips for the proposed development. This approach is considered appropriate within the industry for urban infill developments.

To convert ITE vehicle trip rates to person trips, an auto occupancy factor and a non-auto trip factor were applied to the ITE vehicle trip rates. Our review of available literature suggests that a combined factor of approximately 1.3 is considered reasonable to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%. As such, the person trip generation for the proposed site is summarized in Table 5.

Table 5: Modified Person Trip Generation

Land Use	Area	AM Peak (persons/h)			PM Peak (persons/h)		
		In	Out	Total	In	Out	Total
Condominiums	500 du	42	184	226	149	92	241
Specialty Retail Centre	15,963 ft²	21	18	39	34	44	78
Office	22,712 ft²	12	4	16	10	21	31
Total Person Trips		**75**	**206**	**281**	**193**	**157**	**350**

Note: 1.3 factor to account for typical North American auto occupancy values of approximately 1.15 and combined transit and non-motorized modal shares of less than 10%

The person trips shown in Table 5 for the proposed site were then reduced by modal share values, including a reduction for 'pass-by' trips based on the site's location and proximity to adjacent communities, employment, other shopping uses and transit availability. Modal share and 'pass-by' values for the proposed development are summarized in Table 6.

Table 6: Site Trip Generation

Travel Mode	Mode Share	AM Peak (persons/h)			PM Peak (persons/h)		
		In	Out	Total	In	Out	Total
Auto Driver	45%	34	93	127	87	71	158
Auto Passenger	10%	7	20	27	19	15	34
Transit	30%	23	62	85	58	48	106
Non-motorized	15%	11	31	42	29	23	52
Total Person Trips	100%	75	206	281	193	157	350
Less Retail 30% Pass-By		-3	-3	-6	-5	-5	-10
Total 'New' Auto Trips		**31**	**90**	**121**	**82**	**66**	**148**

As shown in Table 6, the resulting number of potential 'new' two-way vehicle trips for the proposed development is 121 and 148 veh/h during the weekday morning and afternoon peak hours, respectively. This amounts to an approximate 1% to 6% increase in traffic volumes at the study area intersections when appropriately distributed.

3.6 Vehicle Traffic Distribution and Assignment

Traffic distribution was based on the different types of land uses, existing volume splits at study area intersections and our knowledge of the surrounding area. The resultant distribution is outlined as follows:

Residential

- 35% to/from the east via Scott Street and Wellington Street;
- 35% to/from the south via Parkdale Avenue towards HWY 417;
- 15% to/from the north via Parkdale Avenue towards Sir John A. Macdonald Parkway; and
- 15% to/from the west via Scott Street and Wellington Street;

100%

Retail

- 40% to/from the east via Scott Street and Wellington Street;
- 40% to/from the west via Scott Street and Wellington Street;
- 10% to/from the north via Parkdale Avenue; and
- 10% to/from the south via Parkdale Avenue;

100%

Office

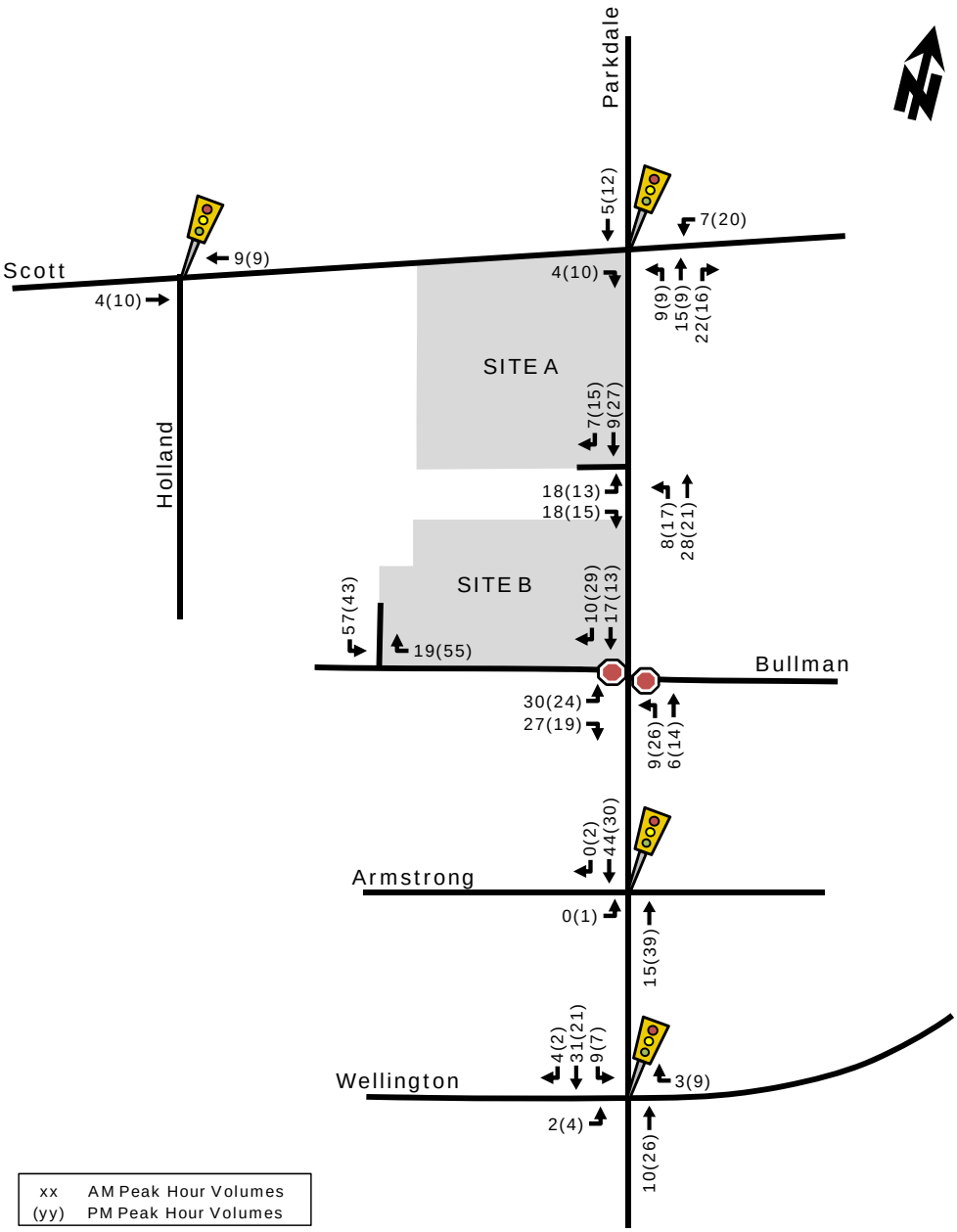
- 50% to/from the south via Parkdale Avenue towards HWY 417;
- 15% to/from the north via Parkdale Avenue towards Sir John A. Macdonald Parkway;
- 20% to/from the east Scott Street and Wellington Street; and
- 15% to/from the west via Scott Street and Wellington Street;

100%

The site driveway connections identified on the attached Site Plan are located along Scott Street and Bullman Street. Based on Scott Street's existing volumes, five lane cross-section, and the existing queues at the Scott/Parkdale intersection, it has been recommended to Richcraft that the Scott Street driveway be relocated to Parkdale Avenue. The proponent has indicated that for the next phase of applications, the Site Plan will be updated to reflect a driveway connection to Parkdale Avenue, as opposed to the currently shown driveway connection to Scott Street. As such, the following analysis assumes a single driveway connection to Parkdale Avenue and a single driveway connection to Bullman Street.

Based on this assumption and the above-noted distributions, 'new' and 'pass-by' site-generated trips are assigned to study area intersections and are illustrated as Figure 6.

Figure 6: 'New' and 'Pass-by' Site-Generated Traffic Volumes

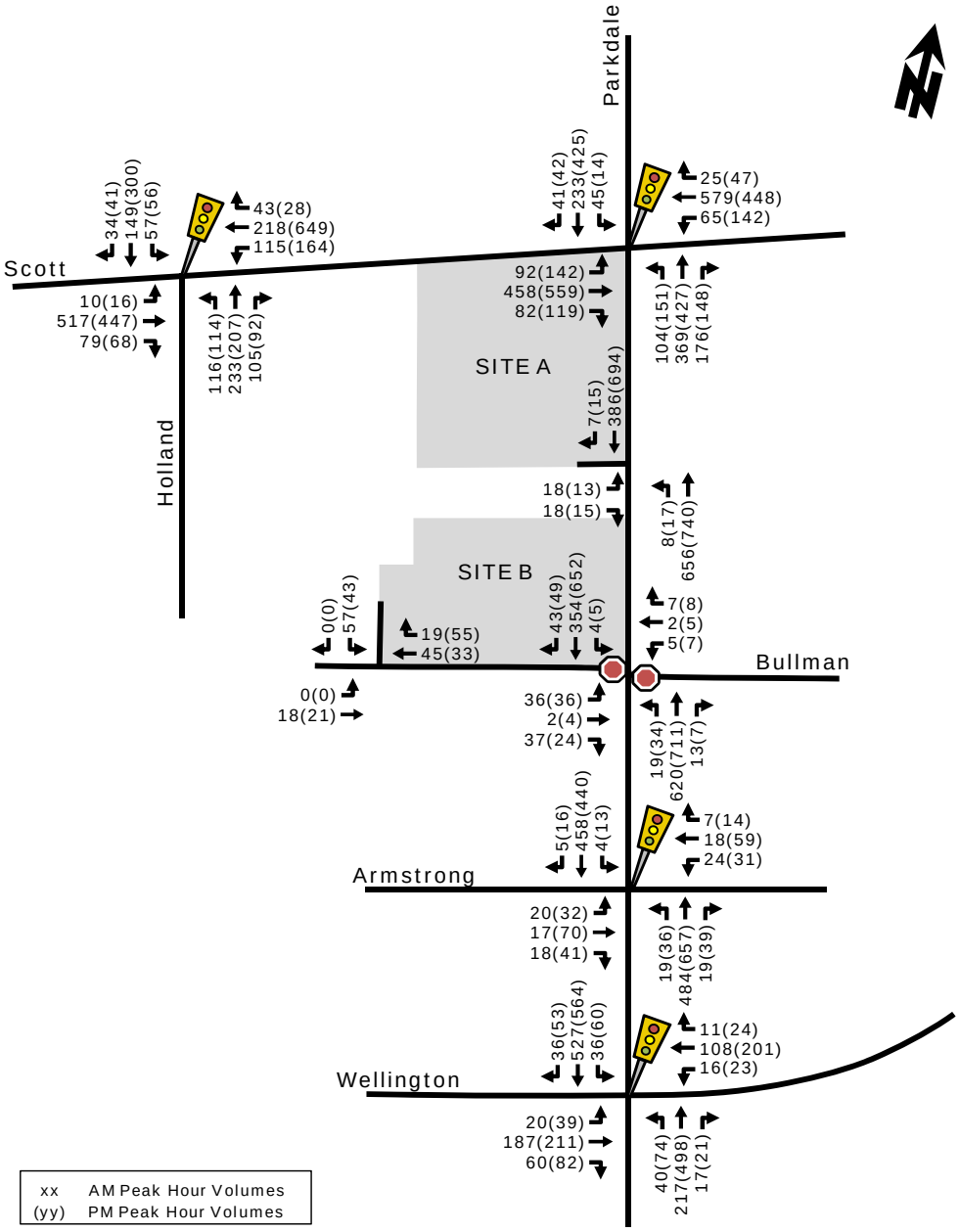


4. FUTURE TRAFFIC OPERATIONS

4.1 Projected Conditions at Full Site Development

The total projected volumes associated with the proposed development were derived by superimposing 'new' and 'pass-by' site-generated volumes (Figure 6) onto projected baseline traffic volumes (Figure 5). Total projected volumes are illustrated as Figure 7.

Figure 7: Total Projected Peak Hour Traffic Volumes



The following Table 7 provides a summary of projected performances of study area intersections at full site occupancy. The SYNCHRO model output of projected conditions is provided within Appendix E.

Table 7: Projected Performance of Study Area Intersections

Intersection	Weekday AM Peak (PM Peak)					
	'Critical Movement'			'Intersection as a Whole'		
	LoS	max. v/c or avg. delay (s)	Movement	Delay (s)	LoS	v/c
Parkdale/Scott	F(F)	1.38(1.69)	NBT(NBT)	71.8(114.9)	D(F)	0.86(1.14)
Holland/Scott	B(D)	0.69(0.88)	NBT(NBL)	18.3(20.5)	A(A)	0.42(0.51)
Parkdale/Site	B(C)	14.4(16.0)	EBL(EBL)	0.6(0.6)	-	-
Parkdale/Bullman	C(C)	17.6(23.1)	EBT(EBT)	1.7(1.9)	-	-
Bullman/Site	A(A)	9.2(9.1)	SBL(SBL)	3.8(2.6)	-	-
Parkdale/Armstrong	A(C)	0.46(0.75)	NBT(NBT)	10.3(20.0)	A(A)	0.41(0.58)
Parkdale/Wellington	D(D)	0.88(0.89)	SBT(SBT)	34.5(27.7)	B(C)	0.65(0.71)

Note: Analysis of signalized intersections assumes a PHF of 0.95 and a saturation flow rate of 1800 veh/h/lane.

As shown in Table 7, with no signal timing plan modifications, the signalized study area intersections, 'as a whole', are projected to operate at an acceptable LoS 'D' or better during both peak hours, with the exception of the Scott/Parkdale intersection during the weekday afternoon peak hour, which is projected to fail (LoS 'F'). The 'critical movements' are projected to operate similar to existing conditions summarized in Table 1.

With regards to the proposed site driveway connections (one to Parkdale Avenue and one to Bullman Street), they are projected to operate with acceptable delays of 10 to 16 seconds during peak hours with 95th percentile queues in the order of 2 meters (no more than 1 vehicle in queue) on site. No queues or delays are projected for vehicles entering the site.

Mitigative measures to improve the operations at the Parkdale/Scott intersection include an auxiliary northbound left-turn lane and an afternoon peak hour advanced protected/permitted westbound left-turn signal phase. However, these mitigative measures may not be feasible due to right-of-way constraints, geometric constraints or signal timing coordination and therefore, require further investigation by/with the City of Ottawa. It is noteworthy that the City's right-of-way protection policy for this section of Parkdale Avenue is 26 m. If this full right-of-way is achieved, there may be sufficient room to introduce a northbound left-turn lane at Scott Street.

4.2 Neighbourhood Impacts

With respect to "cut-through" traffic, drivers may elect to use local community roadways if Parkdale Avenue is experiencing heavy traffic congestion (e.g. Spencer Street, Armstrong Street, Hamilton Avenue, etc.). However, when Parkdale Avenue is operating acceptably, the majority of site-generated traffic will use Parkdale Avenue. It should be noted that if 100% of the projected site-generated traffic were to only use local community roadways, the projected impact of the new 121 and 148 veh/h, distributed to 4 or 5 local roadways, equates to less than 1 new vehicle per minute per roadway. If this were to occur, the impact to local roadways would not be significant.

With respect to neighbourhood transit, the site is projected to generate an approximate total of 85 and 106 'new' two-way transit person trips during the weekday morning and afternoon peak hours, respectively. This amount of additional transit ridership can be easily accommodated by the nearby local and rapid transit system.

5. SITE PLAN REVIEW

This section provides an overview of site access, parking requirements, pedestrian circulation and transit accessibility. The Preliminary Site Plan was previously illustrated as Figure 2.

Parking

A total of 350 residential parking spaces are proposed to serve the 500 dwelling units, which is sufficient with respect to the City's Zoning By-Law requirements for Area B, identified in Schedule 1 of the City's Zoning By-Law. With regard to visitor, retail and office parking, a total of 100 parking spaces are proposed to serve the site. According to the City's Zoning By-Law requirements, a minimum of 95 visitor parking spaces, 37 retail parking spaces and 38 office parking spaces should be provided, for a total of 170 parking spaces. Therefore, the proposed amount of visitor, retail and office parking is deficient with respect to the City's By-Law requirements. The proponent may wish to seek a By-Law variance to provide a reduced amount of parking. It should be noted however, that the total amount of proposed residential parking is greater than the City's minimum By-Law requirement by 100 spaces (i.e. the site as a whole will provide sufficient parking with respect to the City's By-Law requirements).

Site Circulation

With regard to on-site circulation, the proposed parking garage is laid out effectively, such that two-way traffic can be efficiently accommodated. The proposed drive aisle widths are noted as 6.7 m, which meets the City's By-Law requirements for two-way traffic.

The ramp grades are not identified on the attached Site Plan, however, efforts should be made to provide ramp grades less than 12% with appropriate transitions to/from the proposed ramps. If exposed to weather, a subsurface melting device sufficient to keep the access ramp free of ice at all times would be of benefit in terms of safety.

Access Requirements

As previously mentioned, for the next phase of applications, the Site Plan will be updated to reflect a site (Tower A) driveway connection to Parkdale Avenue, as opposed to the currently shown driveway connection to Scott Street. As such, the driveway connection to Parkdale Avenue should comply with the City's Zoning and Private Approach By-Laws in terms of dimensioning and location (i.e. 6.7 m in width, a minimum 30 m from Scott Street and a minimum of 3 m from the adjacent property line, if possible).

With respect to the proposed driveway connection to Bullman Street (Tower 'B'), its width is noted as approximately 6 m and its location is approximately 1.5 m from the western property line and 50 m from the nearest intersection street line (Parkdale Avenue).

With respect to the City's Zoning By-Law, the proposed 6 m driveway width does not satisfy Section 107 (1) (a) (ii), which requires a driveway that provides access to a parking lot or parking garage be 6.7 m for two-way traffic. Consideration should be given to providing a 6.7 m driveway connection to Bullman Street for two-way vehicle traffic, or alternatively, a variance will be required.

According to the City's Private Approach By-Law, the offset from Parkdale Avenue is sufficient. However, the proximity of the proposed driveway to the western property line is less than 3 m, which does not satisfy Section 25 (o) of the Private Approach By-Law. Section 25 (o) of the Private Approach By-Law does state, however, the General Manager may reduce the off-set to a minimum of 0.3 metres provided that the proposed access is:

i. located a safe distance from the access serving the adjacent property;

ii. in such a manner that there are adequate sight lines for vehicles exiting from the property; and

iii. in such a manner that it does not create a traffic hazard.

Given the adjacent property's driveway is approximately 3 m from the shared property line and there is currently a hydro pole located within the sight triangle for the Tower 'B' driveway, consideration should be given to relocating the proposed Bullman Street driveway connection, such that its location is greater than 3 m from the adjacent western property line and greater than 45 m from Parkdale Avenue.

Pedestrians/Transit

Connecting pedestrians to local/rapid transit service, other nearby employment, shopping and recreational opportunities, sidewalks are currently provided along the site's frontages to Bullman Street, Parkdale Avenue and Scott Street, which are all connected to the established pedestrian network previously described in Section 2 – Existing Conditions.

Bicycles

A total of 280 bicycle parking spaces are proposed to serve the development, which is sufficient with respect to the City's By-Law requirements. The location of the bicycle parking is noted as 'underground' on the attached Site Plan, which is suitable assuming the retail and office patrons have access to these spaces as well as the residential patrons.

6. TRANSPORTATION DEMAND MANAGEMENT

Depending on the nature of a development, Transportation Demand Management (TDM) strategies have the potential to be an integral part of a planned development in order to address and support the City's policies with regard to TDM. For this particular site, its proximity to the existing local and rapid transit service is considered very advantageous in lessening the reliance on the private automobile. However, a number of other TDM measures could also be considered, including:

- improving the quality and safety of pedestrian facilities, such as enhanced sidewalks/lighting;
- carpool/ride-sharing programs;

- discounted transit passes (i.e. OC Transpo's ECOPASS); and
- provide change area/shower facilities for any on-site staff to encourage cycling.

TDM strategies are important in encouraging active modes of transportation to/from the site, further lessening the reliance on the private automobile.

7. FINDINGS AND RECOMMENDATIONS

EXISTING CONDITIONS

- The study area intersections adjacent to the site are (according to SYNCHRO) currently operating 'as a whole' with an overall LoS 'D' or better during the weekday morning and afternoon peak hours, with the exception on the Scott/Parkdale intersection during the afternoon peak hour;

- With regard to 'critical movements' at study area intersections, they are noted (according to SYNCHRO) as operating at an acceptable LoS 'D' or better during the peak hours, with the exception of the northbound through movements at the Scott/Parkdale intersection during the morning and afternoon peak hours;

- In contrast, the 6 independent observations revealed that the degree of traffic congestion on Parkdale Avenue can fluctuate significantly between failing and acceptable conditions day-by-day, which is greatly dependant on how HWY 417 and the Sir John A. Macdonald Parkway are operating;

- Based on the available data, there does not appear to be any safety issues at the study area intersections adjacent to the proposed site;

PROJECTED CONDITIONS

- The traffic generated by local area developments in the vicinity of the site was accounted for by applying a 10% growth factor to the existing traffic volumes along Scott Street, Parkdale Avenue and Wellington Street West;

- The proposed development is projected to generate 'new' two-way vehicle volumes of approximately 121 and 148 veh/h during the weekday morning and afternoon peak hours, respectively;

- The signalized study area intersections, 'as a whole', are projected to operate (according to SYNCHRO) at an acceptable LoS 'D' or better during both peak hours, with the exception of the Scott/Parkdale intersection during the weekday afternoon peak hour, which is projected to fail (LoS 'F');

- The 'critical movements' at study area intersections are projected to operate (according to SYNCHRO) similar to existing conditions;

- Based on current field observations, the additional site-generated traffic will somewhat add to existing queues and delays along Parkdale Avenue. As Parkdale Avenue can be very congested today, and without future plans to increase road capacity, the proposed site's close proximity to current rapid transit and future LRT will generate a high non-auto modal share;

- Possible mitigative measures to improve the operations at the Parkdale/Scott intersection include an auxiliary northbound left-turn lane (if right-of-way is available) and an afternoon peak hour advanced protected/permitted westbound left-turn signal phase;

SITE PLAN

- The proposed site's parking layout is well arranged and meets By-Law requirements;

- The proposed driveway connection to Scott Street should be relocated to Parkdale Avenue and its location and dimensioning should comply with the City's respective By-Laws;

- The proposed driveway connection to Bullman Street should be relocated such that its location is greater than 3 m from the adjacent western property line and greater than 45 m from Parkdale Avenue. Its width should also be ideally to 6.7 m to satisfy the City's Zoning By-Law requirement for two-way traffic.

- Appropriate sight-triangles should be provided at the proposed driveway connection to Bullman Street (i.e. consideration should be given to the location of existing hydro poles along the north side of Bullman Street); and

- The proposed vehicle/bicycle parking supply and dimensioning is noted as being sufficient with respect to the City's By-Law requirements.

8. CONCLUSIONS

Based on the foregoing analysis of the proposed development, the following transportation-related conclusions are offered:

- The proposed development is projected to add traffic to some study area intersections that are already/projected failing intersections;

- The proposed development is projected to generate some neighbourhood "cut-through" traffic due to the location of their garage connections and the periodic existing congestion on Parkdale Avenue; and

- The close proximity to City-wide bike/walk systems and future LRT will result in the development having a high non-auto modal share.

In summary, while there will be some adverse traffic impacts, the proposed 274 Parkdale Avenue Mixed-Use development fits well into the context of the surrounding area, and its location relative to rapid transit and design serves to promote use of walking, cycling, and transit modes, thus supporting City of Ottawa policies, goals and objectives with respect to redevelopment, intensification and modal share.

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Ottawa Operations

Appendix A
Current Peak Hour Volumes

Ottawa — *Public Works and Services Department*

Count ID 3084

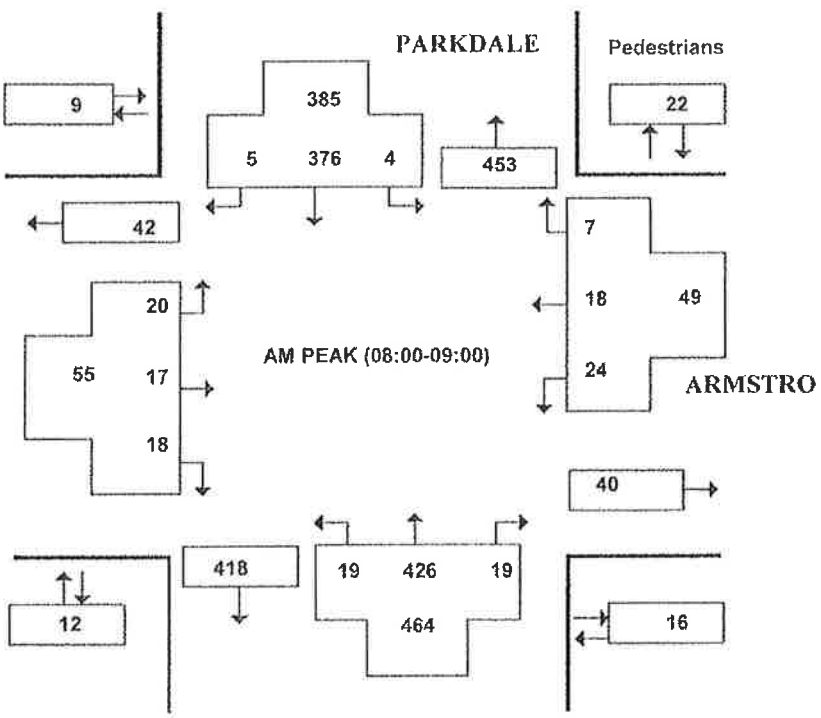
ARMSTRONG ST and PARKDALE AVE

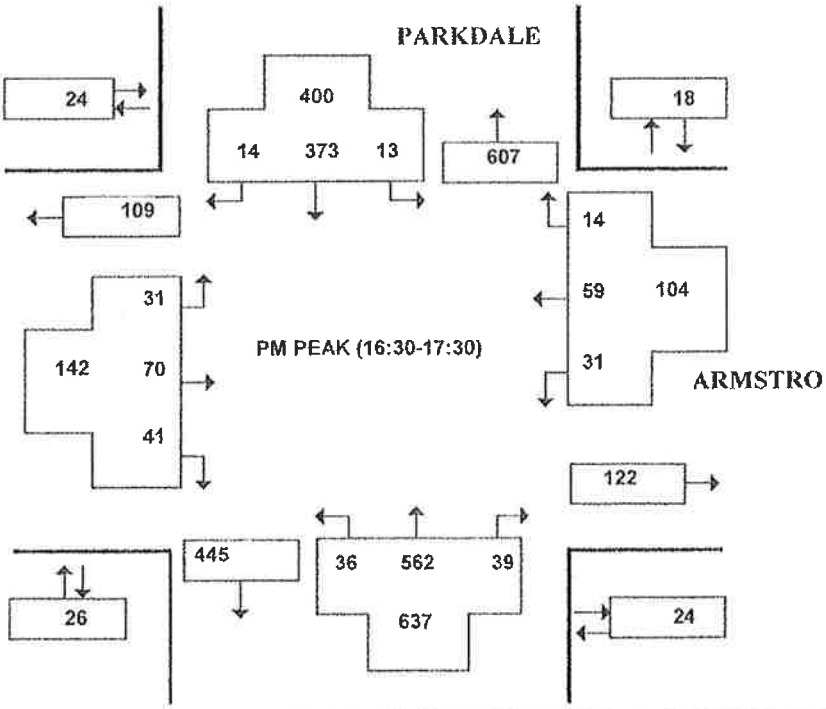
(ULRS Listing ARMSTRO & PARKDALE)

Survey Date: Wednesday 1 August 2012
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in Augus
9





Approved by : GZ

Printed on : 01/03/2013

Public Works and Services Department

Count ID 2866

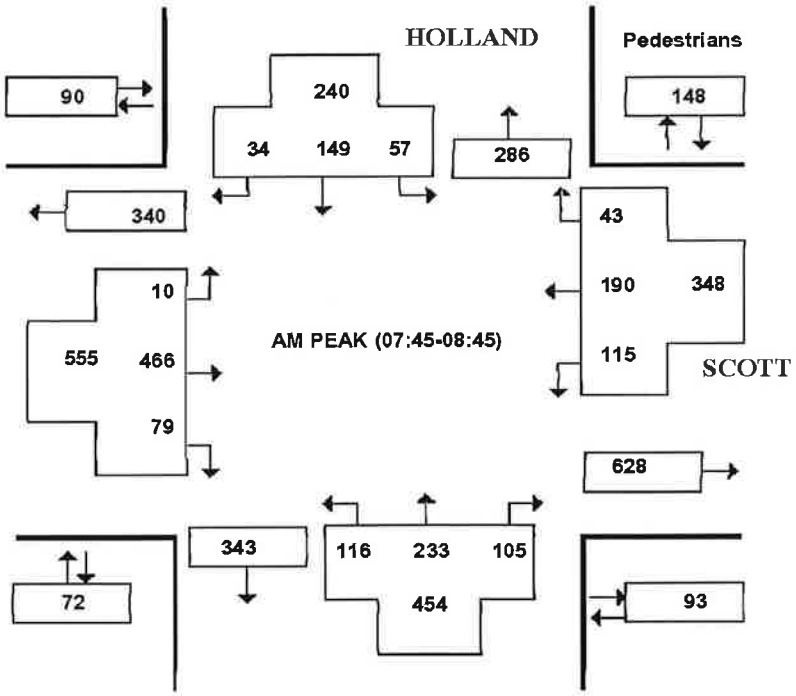
HOLLAND AVE and SCOTT ST

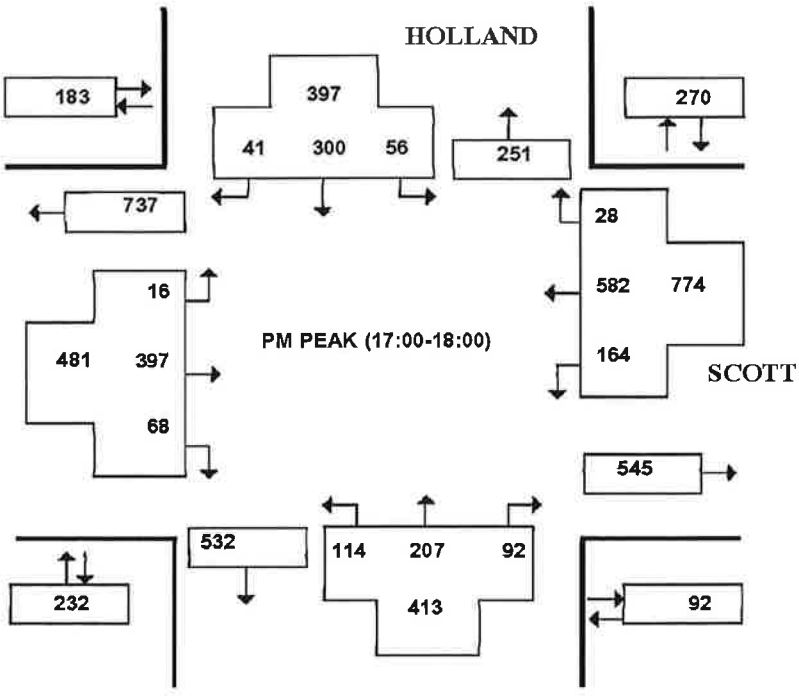
(ULRS Listing HOLLAND & SCOTT)

Survey Date: Wednesday 15 June 2011
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in June i
9





Approved by : DT

Printed on : 09/08/2011

Ottawa *Public Works and Services Department*

Count ID **2866**

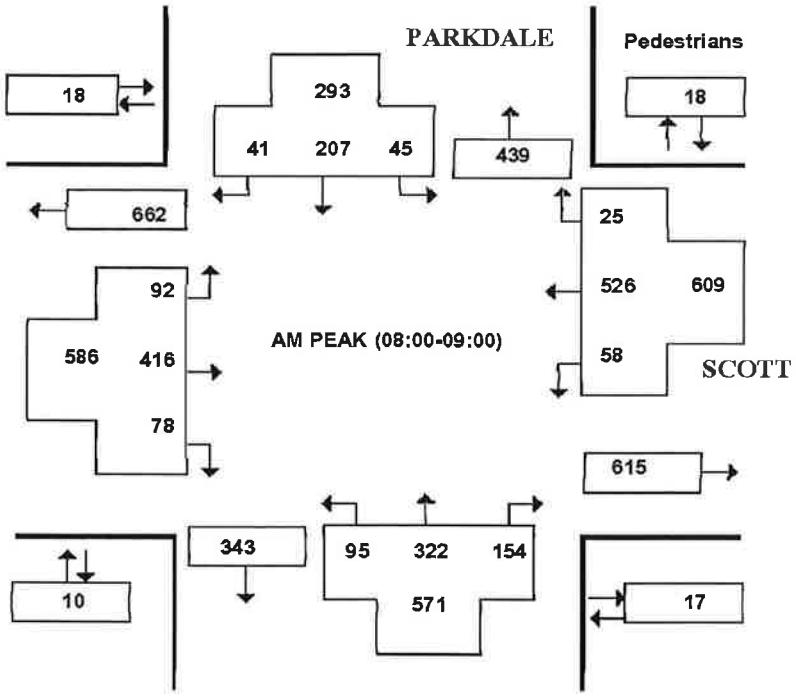
PARKDALE AVE and SCOTT ST

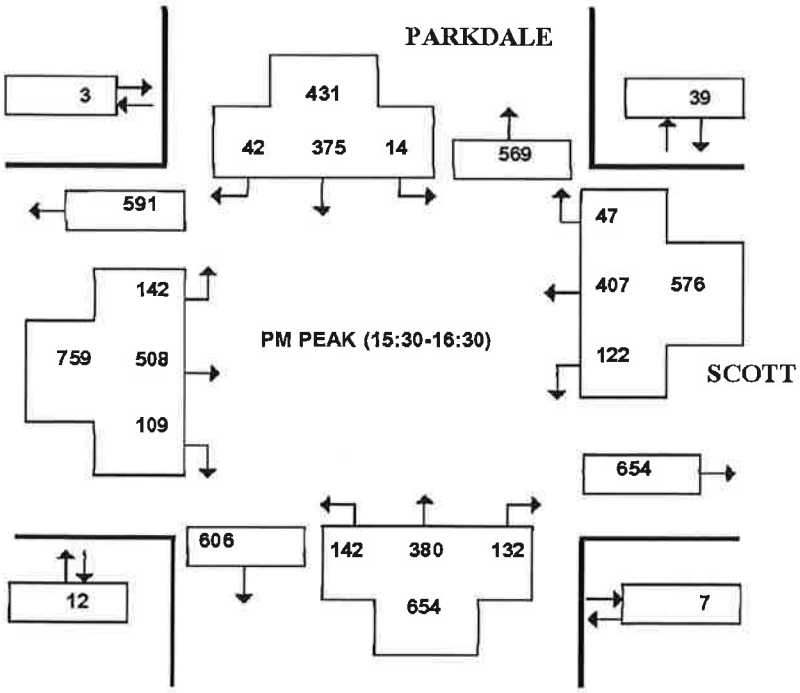
(ULRS Listing PARKDALE & SCOTT)

Survey Date: Tuesday 14 June 2011
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Tuesday in June is 9





Approved by : DT

Printed on : 09/08/2011

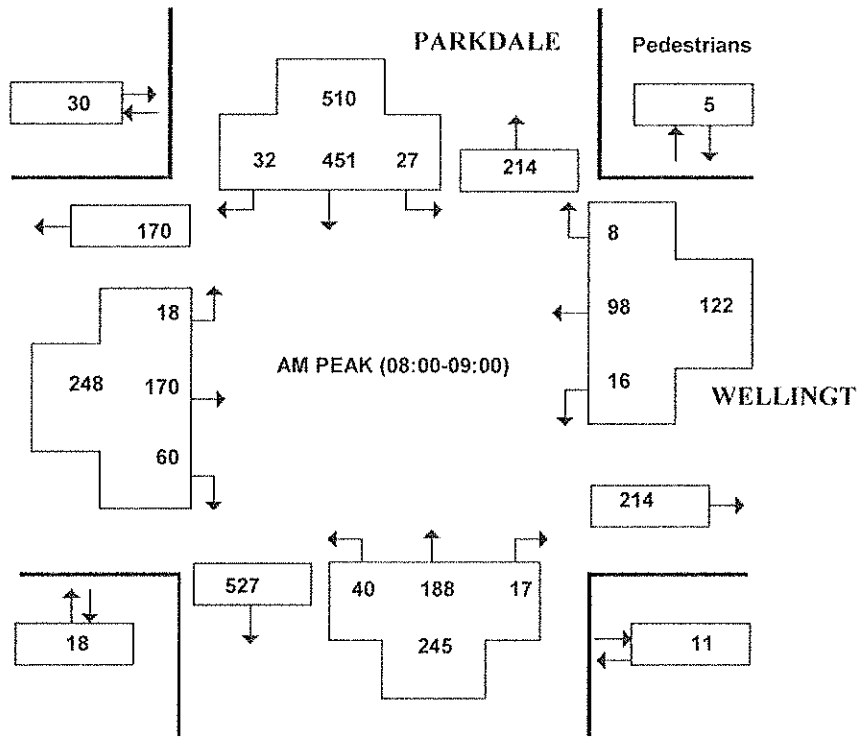
PARKDALE AVE and WELLINGTON ST

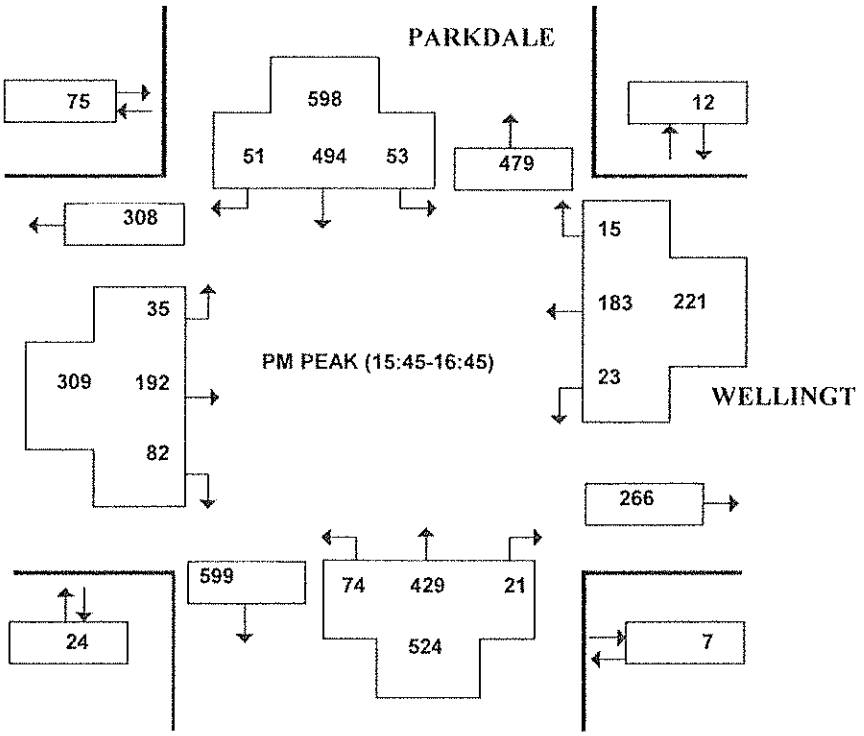
(ULRS Listing PARKDALE & WELLINGT)

Survey Date: Thursday 2 August 2012
Conditions: dry
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 1
Eastbound: 0 Westbound: 0

AADT Factor
Thursday in August i
9





DIRECTIONAL TRAFFIC FLOW

Intersection: **Parkdale** at **Bullman**

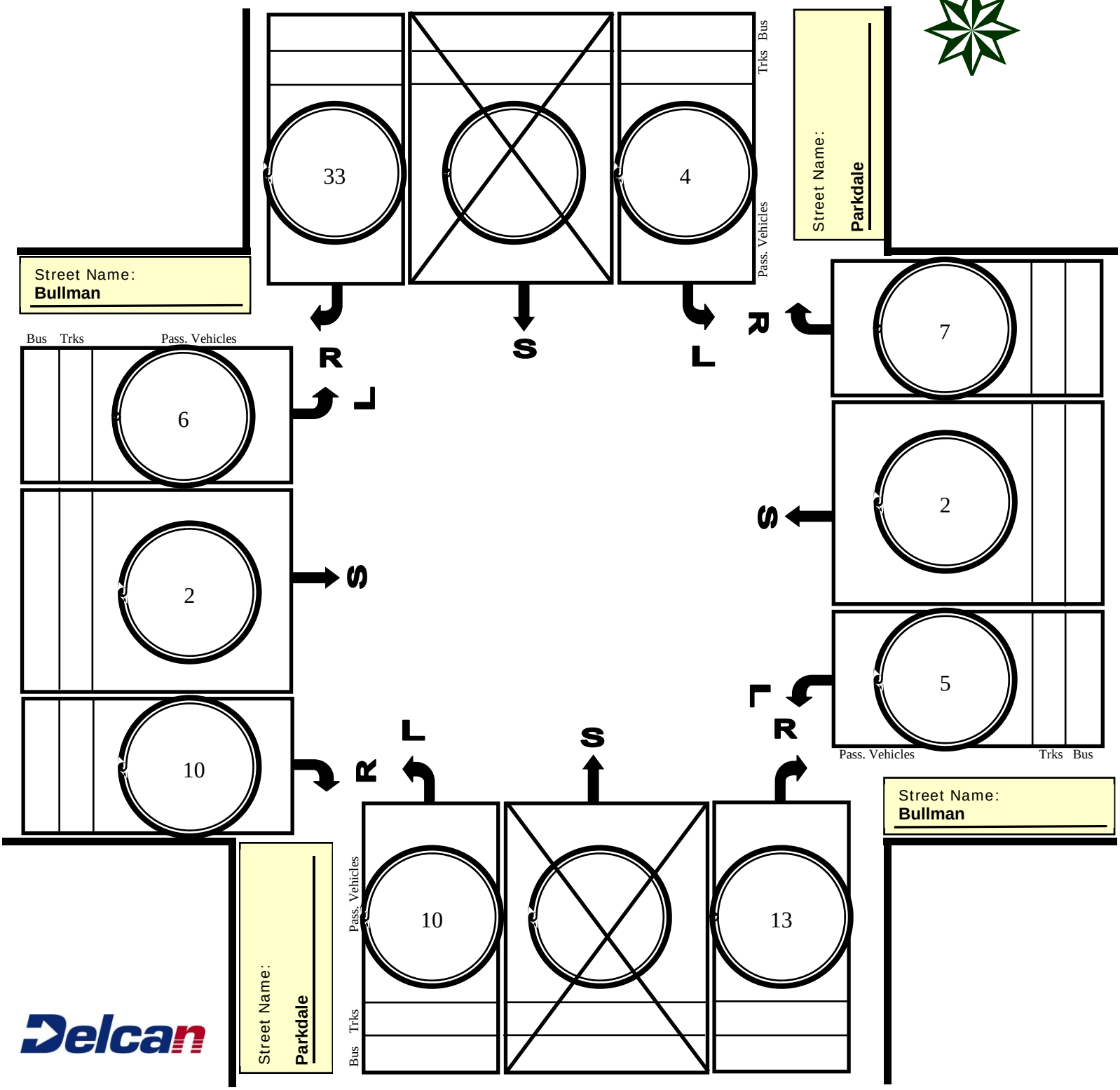
DATE: Day: **7** Month: **May** Year: **2013** Day of Week: **Tuesday**

Observer: **Alex Buck** Weather: _____

Chkd by: _____ Date: _____

TIME PERIOD: From: **8 : 00** To: **9 : 00**

Instructions: 1) Use tally marks to indicate vehicles.
2) Use one sheet for each 15-minute period.



Delcan

DIRECTIONAL TRAFFIC FLOW

Intersection: **Parkdale** at **Bullman**

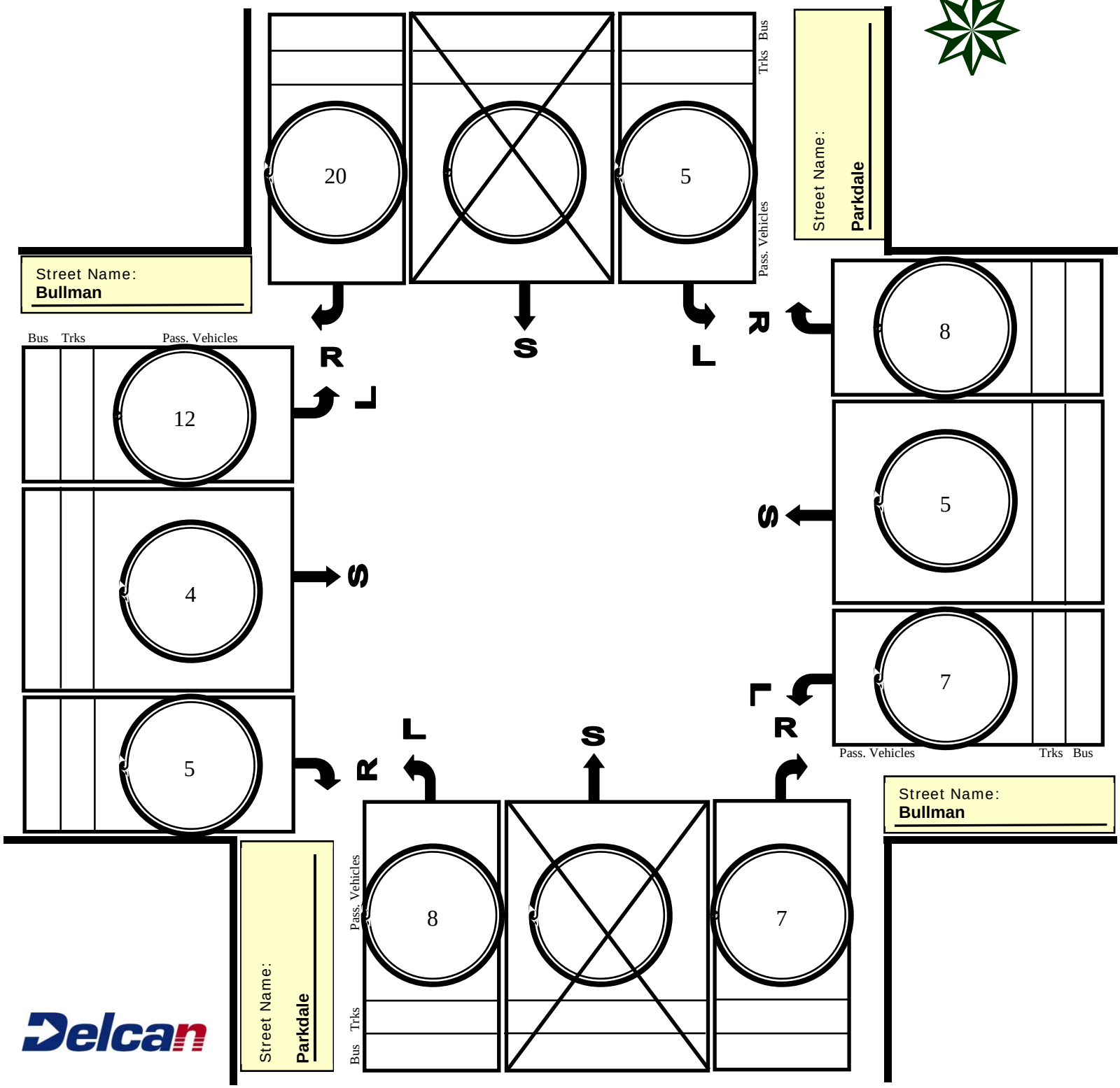
DATE: Day: **7** Month: **May** Year: **2013** Day of Week: **Tuesday**

Observer: **Alex Buck** Weather: _____

Chkd by: _____ Date: _____

TIME PERIOD: From: **4 : 00** To: **5 : 00**

Instructions: 1) Use tally marks to indicate vehicles.
2) Use one sheet for each 15-minute period.



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Appendix B
SYNCHRO Capacity Analysis:
Existing Conditions

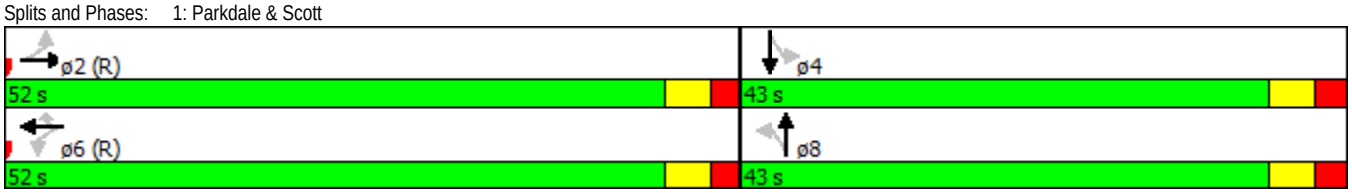
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	92	416	58	526	25	95	322	45	207
Lane Group Flow (vph)	97	520	61	554	26	0	601	47	261
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	2	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	32.7	32.7	32.7	32.7
Total Split (s)	52.0	52.0	52.0	52.0	52.0	43.0	43.0	43.0	43.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4	5.4	5.4		5.7	5.7	5.7
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effct Green (s)	46.6	46.6	46.6	46.6	46.6		37.3	37.3	37.3
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49		0.39	0.39	0.39
v/c Ratio	0.30	0.35	0.18	0.37	0.04		1.15	0.23	0.42
Control Delay	14.5	11.6	15.4	16.0	4.1		116.6	23.1	22.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.5	11.6	15.4	16.0	4.1		116.6	23.1	22.5
LOS	B	B	B	B	A		F	C	C
Approach Delay		12.1		15.4			116.6		22.6
Approach LOS		B		B			F		C
Queue Length 50th (m)	11.2	30.4	6.0	31.9	0.0		~128.4	5.7	32.5
Queue Length 95th (m)	21.4	23.8	13.8	43.8	3.6		#192.4	14.2	53.4
Internal Link Dist (m)		225.1		242.5			96.9		79.4
Turn Bay Length (m)	65.0		40.0		50.0			45.0	
Base Capacity (vph)	320	1477	336	1496	685		522	204	622
Starvation Cap Reductn	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.30	0.35	0.18	0.37	0.04		1.15	0.23	0.42

Intersection Summary	
Cycle Length: 95	
Actuated Cycle Length: 95	
Offset: 91 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.15	
Intersection Signal Delay: 43.5	Intersection LOS: D
Intersection Capacity Utilization 96.6%	ICU Level of Service F
Analysis Period (min) 15	

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Parkdale & Scott

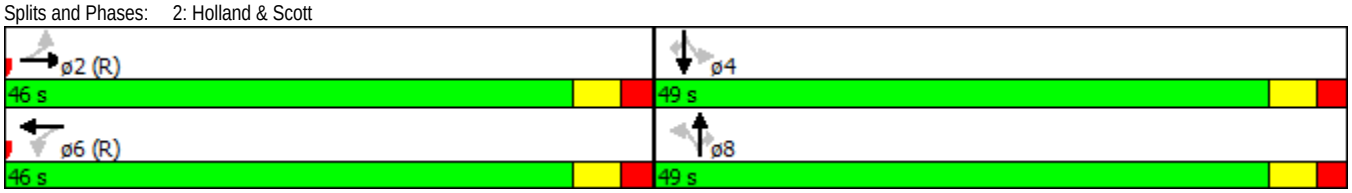


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	10	466	115	190	116	233	105	57	149	34
Lane Group Flow (vph)	0	585	121	245	122	245	111	60	157	36
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	36.8	36.8	36.8	36.8	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	46.0	46.0	46.0	46.0	49.0	49.0	49.0	49.0	49.0	49.0
Total Split (%)	48.4%	48.4%	48.4%	48.4%	51.6%	51.6%	51.6%	51.6%	51.6%	51.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		62.7	62.7	62.7	20.9	20.9	20.9	20.9	20.9	20.9
Actuated g/C Ratio		0.66	0.66	0.66	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio		0.31	0.27	0.12	0.57	0.69	0.29	0.39	0.44	0.11
Control Delay		8.0	7.4	4.5	41.9	43.7	7.1	37.2	34.5	9.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.0	7.4	4.5	41.9	43.7	7.1	37.2	34.5	9.1
LOS		A	A	A	D	D	A	D	C	A
Approach Delay		8.0		5.5		34.7			31.5	
Approach LOS		A		A		C			C	
Queue Length 50th (m)		20.6	6.3	4.6	20.0	41.5	0.0	9.4	25.0	0.0
Queue Length 95th (m)		37.8	m11.8	m7.1	33.8	59.1	11.4	19.0	38.3	6.7
Internal Link Dist (m)		225.9		225.1		214.6			104.7	
Turn Bay Length (m)			120.0		50.0		35.0	45.0		45.0
Base Capacity (vph)		1878	449	1968	448	733	683	315	733	643
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.31	0.27	0.12	0.27	0.33	0.16	0.19	0.21	0.06

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 85 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 18.6 — Intersection LOS: B
Intersection Capacity Utilization 68.5% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Holland & Scott



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	17	24	18	19	426	4	376
Lane Group Flow (vph)	0	58	0	51	0	488	0	405
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.2	22.2	22.2	22.2	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	73.0	73.0	73.0	73.0
Total Split (%)	27.0%	27.0%	27.0%	27.0%	73.0%	73.0%	73.0%	73.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9	1.9	1.7	1.7	1.7	1.7
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.2		5.2		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		21.8		21.8		68.0		68.0
Actuated g/C Ratio		0.22		0.22		0.68		0.68
v/c Ratio		0.17		0.15		0.41		0.34
Control Delay		24.7		29.6		7.6		7.5
Queue Delay		0.1		0.1		0.5		0.0
Total Delay		24.8		29.6		8.2		7.6
LOS		C		C		A		A
Approach Delay		24.8		29.6		8.2		7.6
Approach LOS		C		C		A		A
Queue Length 50th (m)		6.1		6.9		32.6		28.8
Queue Length 95th (m)		16.5		16.7		46.6		43.1
Internal Link Dist (m)		132.6		119.5		122.5		204.7
Turn Bay Length (m)								
Base Capacity (vph)		350		335		1181		1207
Starvation Cap Reductn		0		0		334		0
Spillback Cap Reductn		26		25		0		47
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.18		0.16		0.58		0.35

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 10.0 Intersection LOS: A
Intersection Capacity Utilization 54.3% ICU Level of Service A
Analysis Period (min) 15

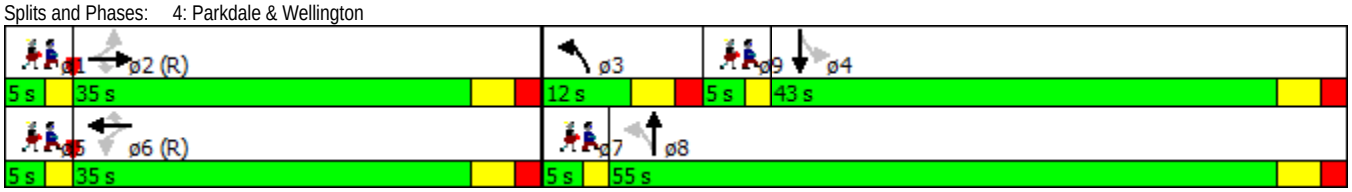
Splits and Phases: 3: Parkdale & Armstrong

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	ø1	ø5
Lane Configurations												
Volume (vph)	18	170	60	16	98	8	40	188	27	451		
Lane Group Flow (vph)	0	198	63	0	120	8	42	216	28	509		
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA		
Protected Phases		2			6		3	8		4	1	5
Permitted Phases	2		2	6		6	8		4			
Detector Phase	2	2	2	6	6	6	3	8	4	4		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0	3.0	3.0
Minimum Split (s)	18.4	18.4	18.4	18.4	18.4	18.4	10.4	15.4	15.4	15.4	5.0	5.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	12.0	55.0	43.0	43.0	5.0	5.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.0%	55.0%	43.0%	43.0%	5%	5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		5.4	5.4		5.4	5.4	5.4	5.4	5.4	5.4		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag			Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	Max	Max	Max	None	None
Act Effct Green (s)		34.6	34.6		34.6	34.6	54.6	54.6	37.6	37.6		
Actuated g/C Ratio		0.35	0.35		0.35	0.35	0.55	0.55	0.38	0.38		
v/c Ratio		0.37	0.14		0.23	0.02	0.19	0.25	0.08	0.86		
Control Delay		27.1	23.7		24.7	21.9	12.6	12.9	20.9	45.9		
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.8		
Total Delay		27.1	23.7		24.7	21.9	12.6	12.9	20.9	46.7		
LOS		C	C		C	C	B	B	C	D		
Approach Delay		26.3			24.5			12.9		45.3		
Approach LOS		C			C			B		D		
Queue Length 50th (m)		28.5	8.3		16.4	1.0	3.6	20.8	3.7	95.5		
Queue Length 95th (m)		47.3	17.7		29.8	4.1	8.4	34.1	10.0	#147.2		
Internal Link Dist (m)		37.0			13.5			115.8		122.5		
Turn Bay Length (m)			20.0			20.0	50.0		40.0			
Base Capacity (vph)		533	443		524	409	228	862	369	593		
Starvation Cap Reductn		0	0		0	0	0	0	0	12		
Spillback Cap Reductn		0	0		0	0	0	0	0	0		
Storage Cap Reductn		0	0		0	0	0	0	0	0		
Reduced v/c Ratio		0.37	0.14		0.23	0.02	0.18	0.25	0.08	0.88		

Intersection Summary

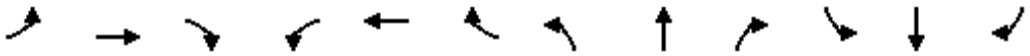
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 31.8 — Intersection LOS: C
Intersection Capacity Utilization 69.9% — ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Parkdale & Wellington



Lane Group	ø7	ø9
Lane Configurations		
Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	6	2	10	5	2	7	10	558	13	4	306	33
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	6	2	11	5	2	7	11	587	14	4	322	35
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								229			121	
pX, platoon unblocked	0.94	0.94	0.92	0.94	0.94	0.91	0.92			0.91		
vC, conflicting volume	972	970	339	975	981	594	357			601		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	755	753	241	758	764	499	260			507		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	99	99	98	99	99	99			100		
cM capacity (veh/h)	298	316	735	297	311	517	1203			958		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	19	15	612	361
Volume Left	6	5	11	4
Volume Right	11	7	14	35
cSH	449	380	1203	958
Volume to Capacity	0.04	0.04	0.01	0.00
Queue Length 95th (m)	1.0	0.9	0.2	0.1
Control Delay (s)	13.4	14.9	0.2	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	13.4	14.9	0.2	0.2
Approach LOS	B	B		

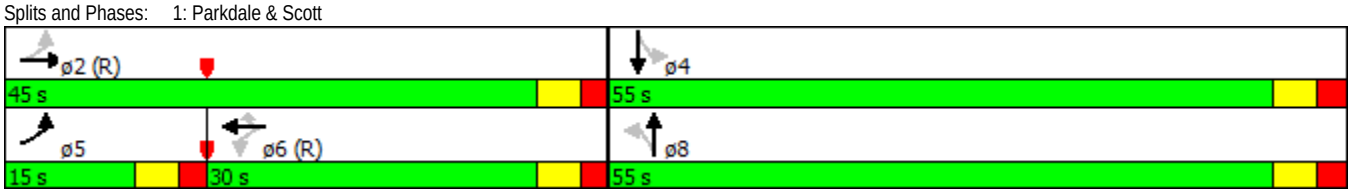
Intersection Summary					
Average Delay	0.7				
Intersection Capacity Utilization	48.1%	ICU Level of Service		A	
Analysis Period (min)	15				

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	142	508	122	407	47	142	380	14	375
Lane Group Flow (vph)	149	650	128	428	49	0	688	15	439
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	27.4	27.4	27.4	27.4	32.7	32.7	32.7	32.7
Total Split (s)	15.0	45.0	30.0	30.0	30.0	55.0	55.0	55.0	55.0
Total Split (%)	15.0%	45.0%	30.0%	30.0%	30.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4	5.4	5.4		5.7	5.7	5.7
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effct Green (s)	39.6	39.6	25.0	25.0	25.0		49.3	49.3	49.3
Actuated g/C Ratio	0.40	0.40	0.25	0.25	0.25		0.49	0.49	0.49
v/c Ratio	0.50	0.54	0.79	0.56	0.12		1.39	0.05	0.56
Control Delay	23.5	20.3	69.8	36.2	2.3		203.6	14.1	20.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	23.5	20.3	69.8	36.2	2.3		203.6	14.1	20.9
LOS	C	C	E	D	A		F	B	C
Approach Delay		20.9		40.6			203.6		20.6
Approach LOS		C		D			F		C
Queue Length 50th (m)	15.2	34.9	23.3	38.4	0.0		~180.6	1.5	56.2
Queue Length 95th (m)	25.9	46.4	#55.2	53.8	2.7		#248.8	5.0	85.4
Internal Link Dist (m)		225.1		242.5			89.2		79.4
Turn Bay Length (m)	65.0		40.0		50.0			45.0	
Base Capacity (vph)	303	1193	162	762	407		496	276	783
Starvation Cap Reductn	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.49	0.54	0.79	0.56	0.12		1.39	0.05	0.56

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 18 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.39
Intersection Signal Delay: 74.9 — Intersection LOS: E
Intersection Capacity Utilization 115.6% — ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Parkdale & Scott



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	16	397	164	582	114	207	92	56	300	41
Lane Group Flow (vph)	0	507	173	642	120	218	97	59	316	43
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	36.8	36.8	36.8	36.8	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	60.0	60.0	60.0	60.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		63.2	63.2	63.2	25.4	25.4	25.4	25.4	25.4	25.4
Actuated g/C Ratio		0.63	0.63	0.63	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio		0.29	0.37	0.33	0.88	0.54	0.23	0.29	0.78	0.11
Control Delay		9.3	8.6	6.1	84.3	35.9	6.5	31.2	47.2	8.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		9.3	8.6	6.1	84.3	35.9	6.5	31.2	47.2	8.0
LOS		A	A	A	F	D	A	C	D	A
Approach Delay		9.3		6.6		42.7			40.9	
Approach LOS		A		A		D			D	
Queue Length 50th (m)		19.6	9.0	17.0	22.4	36.7	0.0	9.2	57.2	0.0
Queue Length 95th (m)		36.1	m18.1	m26.2	#45.3	51.9	10.4	18.1	76.8	7.1
Internal Link Dist (m)		225.9		225.1		214.6			104.7	
Turn Bay Length (m)			120.0		50.0		35.0	45.0		45.0
Base Capacity (vph)		1758	467	1917	186	552	533	280	552	497
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.29	0.37	0.33	0.65	0.39	0.18	0.21	0.57	0.09

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 21.0 — Intersection LOS: C
Intersection Capacity Utilization 81.7% — ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Holland & Scott

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	31	70	31	59	36	562	13	373
Lane Group Flow (vph)	0	150	0	110	0	671	0	422
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.2	22.2	22.2	22.2	25.0	25.0	25.0	25.0
Total Split (s)	35.0	35.0	35.0	35.0	65.0	65.0	65.0	65.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9	1.9	1.7	1.7	1.7	1.7
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.2		5.2		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		29.8		29.8		60.0		60.0
Actuated g/C Ratio		0.30		0.30		0.60		0.60
v/c Ratio		0.31		0.24		0.66		0.41
Control Delay		25.3		26.2		15.0		15.2
Queue Delay		0.0		0.0		0.9		0.1
Total Delay		25.3		26.2		16.0		15.3
LOS		C		C		B		B
Approach Delay		25.3		26.2		16.0		15.3
Approach LOS		C		C		B		B
Queue Length 50th (m)		19.1		14.8		94.1		41.3
Queue Length 95th (m)		35.5		28.5		137.7		m61.6
Internal Link Dist (m)		122.7		110.8		122.0		212.8
Turn Bay Length (m)								
Base Capacity (vph)		485		468		1021		1039
Starvation Cap Reductn		0		0		143		0
Spillback Cap Reductn		0		0		0		72
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.31		0.24		0.76		0.44

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 20 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.66	
Intersection Signal Delay: 17.6	Intersection LOS: B
Intersection Capacity Utilization 68.6%	ICU Level of Service C
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

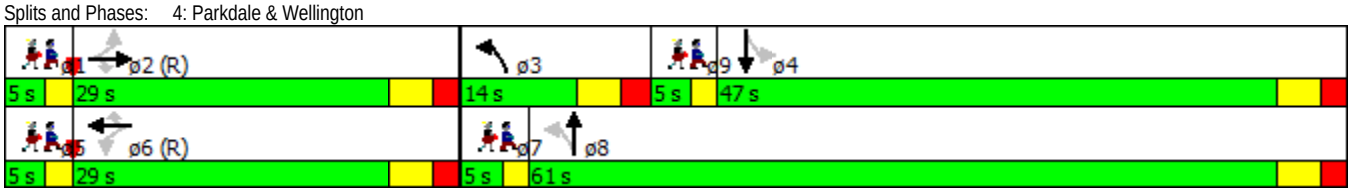
Splits and Phases: 3: Parkdale & Armstrong

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	ø1	ø5
Lane Configurations												
Volume (vph)	35	192	82	23	183	15	74	429	53	494		
Lane Group Flow (vph)	0	239	86	0	217	16	78	474	56	574		
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA		
Protected Phases		2			6		3	8		4	1	5
Permitted Phases	2		2	6		6	8		4			
Detector Phase	2	2	2	6	6	6	3	8	4	4		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0	3.0	3.0
Minimum Split (s)	18.4	18.4	18.4	18.4	18.4	18.4	10.4	15.4	15.4	15.4	5.0	5.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	29.0	14.0	61.0	47.0	47.0	5.0	5.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	14.0%	61.0%	47.0%	47.0%	5%	5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		5.4	5.4		5.4	5.4	5.4	5.4	5.4	5.4		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag			Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	Max	Max	Max	None	None
Act Effct Green (s)		28.6	28.6		28.6	28.6	60.6	60.6	41.6	41.6		
Actuated g/C Ratio		0.29	0.29		0.29	0.29	0.61	0.61	0.42	0.42		
v/c Ratio		0.58	0.23		0.50	0.06	0.31	0.49	0.18	0.88		
Control Delay		37.3	29.4		34.5	26.9	11.6	13.3	17.3	38.5		
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.2	0.0	0.8		
Total Delay		37.3	29.4		34.5	26.9	11.6	13.4	17.3	39.3		
LOS		D	C		C	C	B	B	B	D		
Approach Delay		35.2			34.0			13.2		37.3		
Approach LOS		D			C			B		D		
Queue Length 50th (m)		39.6	12.7		35.0	2.3	5.8	47.7	5.3	103.4		
Queue Length 95th (m)		64.6	25.2		57.4	7.3	11.7	71.8	11.5	#164.1		
Internal Link Dist (m)		24.3			20.7			115.8		122.0		
Turn Bay Length (m)							50.0		40.0			
Base Capacity (vph)		411	372		434	272	263	962	318	650		
Starvation Cap Reductn		0	0		0	0	0	0	0	10		
Spillback Cap Reductn		0	0		0	0	0	76	0	0		
Storage Cap Reductn		0	0		0	0	0	0	0	0		
Reduced v/c Ratio		0.58	0.23		0.50	0.06	0.30	0.53	0.18	0.90		

Intersection Summary

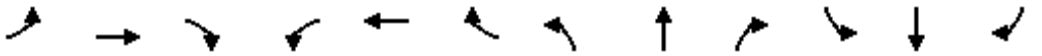
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 70 (70%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 28.8 — Intersection LOS: C
Intersection Capacity Utilization 84.0% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Parkdale & Wellington



Lane Group	ø7	ø9
Lane Configurations		
Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	Max
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	12	4	5	7	5	8	8	634	7	5	581	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	13	4	5	7	5	8	8	667	7	5	612	21
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								237			113	
pX, platoon unblocked	0.88	0.88	0.79	0.88	0.88	0.77	0.79			0.77		
vC, conflicting volume	1332	1324	622	1328	1331	671	633			675		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	755	747	382	751	755	421	395			425		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	99	99	97	98	98	99			99		
cM capacity (veh/h)	272	294	522	277	291	486	913			871		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	21	683	638
Volume Left	13	7	8	5
Volume Right	5	8	7	21
cSH	312	340	913	871
Volume to Capacity	0.07	0.06	0.01	0.01
Queue Length 95th (m)	1.7	1.5	0.2	0.1
Control Delay (s)	17.4	16.3	0.2	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	17.4	16.3	0.2	0.2
Approach LOS	C	C		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	51.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix C
Collision Data and Analysis

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2009/01/01 TO: 2012/01/01

ARMSTRONG ST & PARKDALE AVE

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **13**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR		SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
1	2009/03/27	Frid	14:57	Clear	Daylight	Single vehicle	Non-fatal	V1	W	Dry	Going ahead	Automobile, station	Pedestrian		1
2	2009/12/16	We	10:40	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	S	Dry	Slowing or	Passenger van	Other motor vehicle		
3	2009/12/31	Thu	19:45	Snow	Dark	Single vehicle	P.D. only	V1	S	Loose snow	Going ahead	Automobile, station	Skidding/Sliding		0
4	2010/02/04	Thu	07:05	Clear	Dawn	Rear end	Non-fatal	V1	S	Slush	Slowing or	Pick-up truck	Other motor vehicle		0
								V2	S	Slush	Stopped	Passenger van	Other motor vehicle		
								V3	N	Slush	Stopped	Passenger van	Other motor vehicle		
5	2010/04/28	We	23:15	Clear	Dark	Angle	Non-fatal	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle		
6	2010/08/28	Sat	13:17	Clear	Daylight	Single vehicle	Non-fatal	V1	N	Dry	Turning left	Pick-up truck	Pedestrian		1
7	2010/09/19	Sun	13:31	Clear	Daylight	Rear end	Non	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle		
8	2010/12/19	Sun	10:56	Clear	Daylight	Angle	P.D. only	V1	S	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	W	Wet	Going ahead	Automobile, station	Other motor vehicle		
9	2011/02/09	We	06:30	Clear	Dawn	Rear end	Non-fatal	V1	S	Wet	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	S	Wet	Stopped	Automobile, station	Other motor vehicle		
10	2011/02/09	We	07:40	Clear	Daylight	Angle	Non-fatal	V1	W	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	S	Wet	Going ahead	Pick-up truck	Other motor vehicle		
11	2011/02/12	Sat	09:58	Snow	Daylight	Angle	Non-fatal	V1	S	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2	W	Wet	Going ahead	Automobile, station	Other motor vehicle		
12	2011/10/05	We	23:32	Clear	Dark	Single vehicle	P.D. only	V1	U	Dry	Unknown	Unknown	Unattended vehicle		0

(Note: Time of Day = "00:00" represents unknown collision time

13		2011/11/18	Frid	11:36	Clear	Daylight	Rear end	P.D. only	V1	S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
									V2	S	Dry	Stopped	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2009/01/01 TO: 2012/01/01

PARKDALE AVE & WELLINGTON ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **15**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
1	2009/05/14	Thu	13:30	Rain	Daylight	Turning	P.D. only	V1 N	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Wet	Turning left	Automobile, station	Other motor vehicle		
2	2009/10/10	Sat	10:58	Clear	Daylight	Single vehicle	Non-fatal	V1 S	Dry	Turning left	Delivery van	Pedestrian		1
3	2010/01/29	Frid	19:00	Clear	Dark	Angle	P.D. only	V1 N	Dry	Turning right	Truck - closed	Other motor vehicle		0
								V2 W	Dry	Stopped	Automobile, station	Other motor vehicle		
4	2010/04/16	Frid	16:15	Clear	Daylight	Sideswipe	P.D. only	V1 E	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2 E	Dry	Turning right	Automobile, station	Other motor vehicle		
5	2010/04/18	Sun	17:49	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 S	Dry	Slowing or	Automobile, station	Other motor vehicle		
6	2010/05/01	Sat	12:15	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Unknown	Unknown	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
7	2010/05/11	Tue	15:40	Clear	Daylight	Sideswipe	P.D. only	V1 S	Dry	Changing lanes	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Pick-up truck	Other motor vehicle		
8	2010/08/27	Frid	18:45	Clear	Daylight	Single vehicle	Non-fatal	V1 S	Dry	Turning right	Unknown	Pedestrian		1
9	2010/11/10	We	09:50	Clear	Daylight	Angle	P.D. only	V1 N	Dry	Turning left	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Going ahead	Automobile, station	Other motor vehicle		
10	2010/11/30	Tue	15:20	Rain	Daylight	Sideswipe	P.D. only	V1 W	Wet	Turning right	School bus	Other motor vehicle		0
								V2 W	Wet	Turning left	Automobile, station	Other motor vehicle		
11	2010/12/09	Thu	18:28	Clear	Dark	Sideswipe	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
12	2011/04/14	Thu	23:56	Clear	Dark	Turning	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Turning left	Automobile, station	Other motor vehicle		
13	2011/05/08	Sun	10:40	Clear	Daylight	Rear end	Non-fatal	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Stopped	Automobile, station	Other motor vehicle		
14	2011/10/18	Tue	12:00	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 N	Dry	Stopped	Automobile, station	Other motor vehicle		
15	2011/11/15	Tue	06:54	Clear	Dawn	Single vehicle	Non-fatal	V1 E	Wet	Turning left	Automobile, station	Pedestrian		1

(Note: Time of Day = "00:00" represents unknown collision time

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2009/01/01 TO: 2012/01/01

HOLLAND AVE & SCOTT ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **16**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
1	2009/05/19	Tue	11:27	Clear	Daylight	Sideswipe	P.D. only	V1 N	Dry	Changing lanes	Truck - closed	Other motor vehicle		0
								V2 N	Dry	Going ahead	Municipal transit bus	Other motor vehicle		
2	2009/06/12	Frid	07:21	Clear	Daylight	Turning	P.D. only	V1 W	Dry	Turning left	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Going ahead	Automobile, station	Other motor vehicle		
3	2009/09/27	Sun	17:44	Rain	Daylight	Angle	P.D. only	V1 E	Wet	Turning right	Automobile, station	Other motor vehicle		0
								V2 N	Wet	Turning left	Automobile, station	Other motor vehicle		
4	2010/03/23	Tue	17:32	Rain	Daylight	Rear end	P.D. only	V1 E	Wet	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Wet	Stopped	Automobile, station	Other motor vehicle		
5	2010/07/05	Mo	08:28	Clear	Daylight	Angle	P.D. only	V1 E	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2 N	Dry	Turning right	Automobile, station	Other motor vehicle		
								V3 E	Dry	Going ahead	Automobile, station	Other motor vehicle		
6	2010/10/15	Frid	09:15	Rain	Daylight	Sideswipe	P.D. only	V1 N	Wet	Changing lanes	Passenger van	Other motor vehicle		0
								V2 N	Wet	Turning left	Passenger van	Other motor vehicle		
7	2010/11/09	Tue	11:31	Clear	Daylight	Turning	P.D. only	V1 N	Dry	Turning right	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Turning left	Passenger van	Other motor vehicle		
8	2010/11/29	Mo	17:10	Clear	Dark	Turning	P.D. only	V1 N	Dry	Turning right	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Turning right	Automobile, station	Other motor vehicle		
9	2011/02/28	Mo	13:28	Snow	Daylight	Sideswipe	P.D. only	V1 N	Loose snow	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Loose snow	Going ahead	Delivery van	Other motor vehicle		
10	2011/06/02	Thu	16:50	Clear	Daylight	Turning	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Turning left	Automobile, station	Other motor vehicle		
11	2011/06/13	Mo	08:45	Clear	Daylight	Sideswipe	P.D. only	V1 W	Dry	Changing lanes	Pick-up truck	Other motor vehicle		0
								V2 W	Dry	Changing lanes	Automobile, station	Other motor vehicle		
12	2011/07/22	Frid	08:55	Clear	Daylight	Rear end	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Dry	Stopped	Passenger van	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

13	2011/09/16	Frid	10:53	Clear	Daylight	Turning	P.D. only	V1	N	Dry	Turning right	Delivery van	Other motor vehicle		0
								V2	N	Dry	Turning right	Truck and trailer	Other motor vehicle		
14	2011/09/27	Tue	14:30	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle		
15	2011/11/03	Thu	09:50	Clear	Daylight	Angle	P.D. only	V1	W	Dry	Going ahead	Pick-up truck	Other motor vehicle		0
								V2	S	Dry	Going ahead	Automobile, station	Other motor vehicle		
16	2011/12/25	Sun	14:35	Rain	Daylight	Angle	P.D. only	V1	N	Slush	Turning right	Automobile, station	Skidding/Sliding		0
								V2	W	Wet	Going ahead	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

Collision Main Detail Summary

OnTRAC Reporting System

FROM: 2009/01/01 TO: 2012/01/01

PARKDALE AVE & SCOTT ST

Former Municipality: **Ottawa** Traffic Control: **Traffic signal** Number of Collisions: **26**

COLLISION ID	DATE	DAY	TIME	ENV	LIGHT	IMPACT TYPE	CLASS	DIR	SURFACE COND'N	VEHICLE MANOEUVRE	VEHICLE TYPE	FIRST EVENT	DRIVER ACTION	No. PED
1	2009/02/27	Frid	15:45	Freezing	Daylight	Rear end	P.D. only	V1 W	Ice	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Ice	Turning right	Automobile, station	Other motor vehicle		
2	2009/02/27	Frid	08:19	Rain	Daylight	Turning	P.D. only	V1 E	Wet	Turning left	Pick-up truck	Other motor vehicle		0
								V2 W	Wet	Going ahead	Automobile, station	Other motor vehicle		
								V3 S	Wet	Unknown	Automobile, station	Other motor vehicle		
3	2009/05/12	Tue	17:31	Clear	Daylight	Turning	P.D. only	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 W	Dry	Turning left	Automobile, station	Other motor vehicle		
4	2009/05/21	Thu	07:42	Clear	Daylight	Angle	Non-fatal	V1 W	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
5	2009/05/21	Thu	10:15	Clear	Daylight	Rear end	P.D. only	V1 W	Wet	Slowing or	Automobile, station	Other motor vehicle		0
								V2 W	Wet	Stopped	Automobile, station	Other motor vehicle		
6	2009/06/11	Thu	07:02	Clear	Daylight	Turning	P.D. only	V1 W	Dry	Going ahead	Truck and trailer	Other motor vehicle		0
								V2 E	Dry	Turning left	Automobile, station	Other motor vehicle		
7	2009/06/24	We	16:30	Clear	Daylight	Turning	P.D. only	V1 W	Dry	Going ahead	Passenger van	Other motor vehicle		0
								V2 E	Dry	Turning left	Automobile, station	Other motor vehicle		
8	2009/07/07	Tue	17:30	Clear	Daylight	Rear end	P.D. only	V1 S	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
9	2010/02/19	Frid	19:05	Clear	Dark	Rear end	Non-fatal	V1 N	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Going ahead	Pick-up truck	Other motor vehicle		
10	2010/02/24	We	03:35	Snow	Dark	Angle	P.D. only	V1 S	Loose snow	Going ahead	Automobile, station	Other motor vehicle		0
								V2 E	Loose snow	Slowing or	Automobile, station	Other motor vehicle		
11	2010/05/01	Sat	16:40	Clear	Daylight	Angle	Non-fatal	V1 E	Dry	Going ahead	Automobile, station	Other motor vehicle		0
								V2 S	Dry	Going ahead	Automobile, station	Other motor vehicle		
12	2010/05/04	Tue	08:56	Clear	Daylight	Rear end	P.D. only	V1 N	Dry	Slowing or	Automobile, station	Other motor vehicle		0
								V2 N	Dry	Stopped	Pick-up truck	Other motor vehicle		

(Note: Time of Day = "00:00" represents unknown collision time

13	2010/07/03	Sat	09:45	Clear	Daylight	Turning	P.D. only	V1	W	Dry	Turning left	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
14	2010/08/12	Thu	06:52	Clear	Daylight	Turning	Fatal	V1	E	Dry	Going ahead	Motorcycle	Other motor vehicle	0
								V2	W	Dry	Turning left	Pick-up truck	Other motor vehicle	
15	2011/01/05	We	17:18	Clear	Dusk	Turning	P.D. only	V1	E	Dry	Turning left	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Going ahead	Pick-up truck	Other motor vehicle	
16	2011/01/23	Sun	11:15	Clear	Daylight	Rear end	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
17	2011/04/14	Thu	06:45	Clear	Daylight	Sideswipe	P.D. only	V1	S	Dry	Turning right	Automobile, station	Other motor vehicle	0
								V2	S	Dry	Turning right	Pick-up truck	Other motor vehicle	
18	2011/04/14	Thu	13:59	Clear	Daylight	Angle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Going ahead	Automobile, station	Other motor vehicle	
19	2011/04/29	Frid	20:15	Clear	Dusk	Rear end	P.D. only	V1	N	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	N	Dry	Stopped	Automobile, station	Other motor vehicle	
20	2011/06/02	Thu	19:15	Clear	Daylight	Turning	Non-fatal	V1	E	Dry	Turning left	Automobile, station	Other motor vehicle	0
								V2	W	Dry	Going ahead	Automobile, station	Other motor vehicle	
21	2011/06/05	Sun	14:00	Clear	Daylight	Single vehicle	Non-fatal	V1	N	Dry	Going ahead	Automobile, station	Pedestrian	1
22	2011/06/21	Tue	16:03	Clear	Daylight	Single vehicle	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Building or wall	0
23	2011/07/05	Tue	19:25	Clear	Daylight	Angle	Non-fatal	V1	N	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Going ahead	Automobile, station	Other motor vehicle	
24	2011/09/26	Mo	08:15	Clear	Daylight	Single vehicle	Non-fatal	V1	S	Dry	Turning left	Automobile, station	Pedestrian	1
25	2011/10/18	Tue	18:50	Clear	Dusk	Rear end	P.D. only	V1	E	Dry	Going ahead	Pick-up truck	Other motor vehicle	0
								V2	E	Dry	Turning left	Automobile, station	Other motor vehicle	
26	2011/11/14	Mo	18:16	Clear	Dark	Rear end	P.D. only	V1	E	Dry	Going ahead	Automobile, station	Other motor vehicle	0
								V2	E	Dry	Slowing or	Automobile, station	Other motor vehicle	

COMMENTS: V1 SUDDEN STOP

(Note: Time of Day = "00:00" represents unknown collision time

Total Area

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	15	13	10	9	0	2	1	0	50	72%
Non-fatal injury	4	1	0	6	0	7	0	0	18	26%
Non reportable	1	0	0	0	0	0	0	0	1	1%
Total	20	14	10	15	0	9	1	0	**69**	
	29%	20%	14%	22%	0%	13%	1%	0%		

ARMSTRONG ST @ PARKDALE AVE

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2009-2011	13	13,079	1095	**0.91**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	2	0	0	1	0	1	1	0	5	38%
Non-fatal injury	2	0	0	3	0	2	0	0	7	54%
Non reportable	1	0	0	0	0	0	0	0	1	8%
Total	5	0	0	4	0	3	1	0	**13**	
	38%	0%	0%	31%	0%	23%	8%	0%		

PARKDALE AVE @ SCOTT ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2009-2011	25	25,954	1095	**0.88**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	8	6	1	2	0	1	0	0	18	72%
Non-fatal injury	1	1	0	3	0	2	0	0	7	28%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	9	7	1	5	0	3	0	0	**25**	
	36%	28%	4%	20%	0%	12%	0%	0%		

PARKDALE AVE @ WELLINGTON ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2009-2011	15	18,140	1095	**0.76**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	2	2	5	2	0	0	0	0	11	73%
Non-fatal injury	1	0	0	0	0	3	0	0	4	27%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	3	2	5	2	0	3	0	0	**15**	
	20%	13%	33%	13%	0%	20%	0%	0%		

HOLLAND AVE @ SCOTT ST

Years	Total # Collisions	24 Hr AADT Veh Volume	Days	Collisions/MEV
2009-2011	16	17,287	1095	**0.85**

Classification of Accident	Rear End	Turning Movement	Sideswipe	Angle	Approaching	Single Vehicle (other)	Single vehicle (Unattended vehicle)	Other	Total	
P.D. only	3	5	4	4	0	0	0	0	16	100%
Non-fatal injury	0	0	0	0	0	0	0	0	0	0%
Non reportable	0	0	0	0	0	0	0	0	0	0%
Total	3	5	4	4	0	0	0	0	**16**	
	19%	31%	25%	25%	0%	0%	0%	0%		

Appendix D
Background Traffic Growth Analysis

Parkdale / Scott
8 hrs

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2003	Friday 7 November	3634	4178	3423	3097	4121	4289	4889	4503	32134
2007	Friday 13 July	3825	3694	3330	3312	3149	4028	4846	4116	30300
2008	Friday 9 May	3557	3723	3027	3164	3406	4543	5648	4208	31276
2011	Tuesday 14 June	2586	3986	4765	3285	3634	4653	4864	3925	31698

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	4178	3634	7812	32134				
2007	3694	3825	7519	30300	-11.6%	5.3%	-3.8%	-5.7%
2008	3723	3557	7280	31276	0.8%	-7.0%	-3.2%	3.2%
2011	3986	2586	6572	31698	7.1%	-27.3%	-9.7%	1.3%

Regression Estimate	2003	4017	3924	7941
Regression Estimate	2011	3788	2938	6726
Average Annual Change		**-0.73%**	**-3.55%**	**-2.06%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	4889	4503	9392	32134				
2007	4846	4116	8962	30300	-0.9%	-8.6%	-4.6%	-5.7%
2008	5648	4208	9856	31276	16.5%	2.2%	10.0%	3.2%
2011	4864	3925	8789	31698	-13.9%	-6.7%	-10.8%	1.3%

Regression Estimate	2003	4999	4485	9484
Regression Estimate	2011	5117	3926	9043
Average Annual Change		**0.29%**	**-1.65%**	**-0.59%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	4289	4121	8410	32134				
2007	4028	3149	7177	30300	-6.1%	-23.6%	-14.7%	-5.7%
2008	4543	3406	7949	31276	12.8%	8.2%	10.8%	3.2%
2011	4653	3634	8287	31698	2.4%	6.7%	4.3%	1.3%

Regression Estimate	2003	4168	3853	8020
Regression Estimate	2011	4564	3335	7899
Average Annual Change		**1.14%**	**-1.79%**	**-0.19%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	3423	3097	6520	32134				
2007	3330	3312	6642	30300	-2.7%	6.9%	1.9%	-5.7%
2008	3027	3164	6191	31276	-9.1%	-4.5%	-6.8%	3.2%
2011	4765	3285	8050	31698	57.4%	3.8%	30.0%	1.3%

Regression Estimate	2003	3019	3123	6142
Regression Estimate	2011	4181	3295	7476
Average Annual Change		**4.16%**	**0.67%**	**2.49%**

Parkdale / Scott
AM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2003	Friday 7 November	587	413	374	431	511	770	716	574	4376
2007	Friday 13 July	512	359	338	412	326	635	672	442	3696
2008	Friday 9 May	523	360	345	439	375	771	825	498	4136
2011	Tuesday 14 June	293	439	571	343	609	615	586	662	4118

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	413	587	1000	4376				
2007	359	512	871	3696	-13.1%	-12.8%	-12.9%	-15.5%
2008	360	523	883	4136	0.3%	2.1%	1.4%	11.9%
2011	439	293	732	4118	21.9%	-44.0%	-17.1%	-0.4%

Regression Estimate	2003	384	626	1009
Regression Estimate	2011	401	349	750
Average Annual Change		**0.56%**	**-7.03%**	**-3.64%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	716	574	1290	4376				
2007	672	442	1114	3696	-6.1%	-23.0%	-13.6%	-15.5%
2008	825	498	1323	4136	22.8%	12.7%	18.8%	11.9%
2011	586	662	1248	4118	-29.0%	32.9%	-5.7%	-0.4%

Regression Estimate	2003	751	504	1255
Regression Estimate	2011	655	579	1234
Average Annual Change		**-1.70%**	**1.74%**	**-0.22%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	770	511	1281	4376				
2007	635	326	961	3696	-17.5%	-36.2%	-25.0%	-15.5%
2008	771	375	1146	4136	21.4%	15.0%	19.3%	11.9%
2011	615	609	1224	4118	-20.2%	62.4%	6.8%	-0.4%

Regression Estimate	2003	769	415	1183
Regression Estimate	2011	635	491	1126
Average Annual Change		**-2.36%**	**2.13%**	**-0.62%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	374	431	805	4376				
2007	338	412	750	3696	-9.6%	-4.4%	-6.8%	-15.5%
2008	345	439	784	4136	2.1%	6.6%	4.5%	11.9%
2011	571	343	914	4118	65.5%	-21.9%	16.6%	-0.4%

Regression Estimate	2003	313	448	760
Regression Estimate	2011	490	370	860
Average Annual Change		**5.77%**	**-2.36%**	**1.55%**

Parkdale / Scott
PM Peak

Year	Date	North Leg		South Leg		East Leg		West Leg		Total
		SB	NB	NB	SB	WB	EB	EB	WB	
2003	Friday 7 November	515	960	668	408	751	620	840	786	5548
2007	Friday 13 July	503	749	588	407	568	590	801	714	4920
2008	Friday 9 May	495	676	431	379	673	635	889	798	4976
2011	Tuesday 14 June	431	569	654	606	576	654	759	591	4840

North Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	960	515	1475	5548				
2007	749	503	1252	4920	-22.0%	-2.3%	-15.1%	-11.3%
2008	676	495	1171	4976	-9.7%	-1.6%	-6.5%	1.1%
2011	569	431	1000	4840	-15.8%	-12.9%	-14.6%	-2.7%

Regression Estimate	2003	950	528	1478
Regression Estimate	2011	552	449	1001
Average Annual Change		**-6.55%**	**-2.03%**	**-4.76%**

West Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	840	786	1626	5548				
2007	801	714	1515	4920	-4.6%	-9.2%	-6.8%	-11.3%
2008	889	798	1687	4976	11.0%	11.8%	11.4%	1.1%
2011	759	591	1350	4840	-14.6%	-25.9%	-20.0%	-2.7%

Regression Estimate	2003	856	814	1669
Regression Estimate	2011	793	642	1434
Average Annual Change		**-0.95%**	**-2.93%**	**-1.88%**

East Leg

Year	Counts				% Change			
	EB	*WB*	*EB+WB*	*INT*	*EB*	*WB*	*EB+WB*	*INT*
2003	620	751	1371	5548				
2007	590	568	1158	4920	-4.8%	-24.4%	-15.5%	-11.3%
2008	635	673	1308	4976	7.6%	18.5%	13.0%	1.1%
2011	654	576	1230	4840	3.0%	-14.4%	-6.0%	-2.7%

Regression Estimate	2003	606	729	1335
Regression Estimate	2011	641	565	1207
Average Annual Change		**0.72%**	**-3.12%**	**-1.25%**

South Leg

Year	Counts				% Change			
	NB	*SB*	*NB+SB*	*INT*	*NB*	*SB*	*NB+SB*	*INT*
2003	668	408	1076	5548				
2007	588	407	995	4920	-12.0%	-0.2%	-7.5%	-11.3%
2008	431	379	810	4976	-26.7%	-6.9%	-18.6%	1.1%
2011	654	606	1260	4840	51.7%	59.9%	55.6%	-2.7%

Regression Estimate	2003	613	356	969
Regression Estimate	2011	561	533	1094
Average Annual Change		**-1.09%**	**5.15%**	**1.53%**

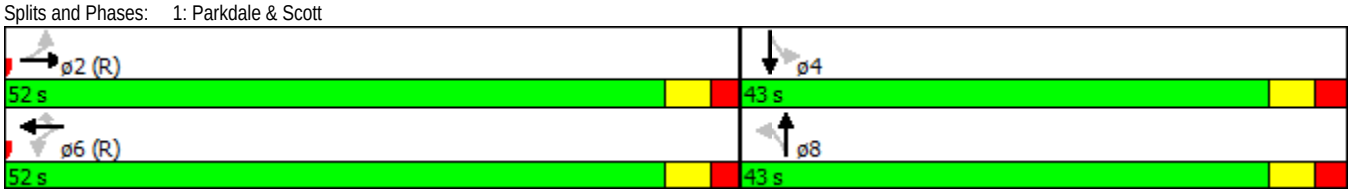
Appendix E
SYNCHRO Capacity Analysis:
2015 Projected Conditions

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	92	458	65	579	25	104	369	45	233
Lane Group Flow (vph)	97	568	68	609	26	0	682	47	288
Turn Type	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	2	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	27.4	27.4	27.4	27.4	27.4	32.7	32.7	32.7	32.7
Total Split (s)	52.0	52.0	52.0	52.0	52.0	43.0	43.0	43.0	43.0
Total Split (%)	54.7%	54.7%	54.7%	54.7%	54.7%	45.3%	45.3%	45.3%	45.3%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4	5.4	5.4		5.7	5.7	5.7
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effct Green (s)	46.6	46.6	46.6	46.6	46.6		37.3	37.3	37.3
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49		0.39	0.39	0.39
v/c Ratio	0.33	0.38	0.22	0.41	0.04		1.38	0.26	0.46
Control Delay	14.8	11.7	16.2	16.4	4.1		211.2	24.4	23.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	14.8	11.7	16.2	16.4	4.1		211.2	24.4	23.5
LOS	B	B	B	B	A		F	C	C
Approach Delay		12.1		16.0			211.2		23.6
Approach LOS		B		B			F		C
Queue Length 50th (m)	11.3	33.8	6.8	35.8	0.0		~166.0	5.7	36.9
Queue Length 95th (m)	23.0	25.5	15.6	48.8	3.6		#232.4	14.7	59.5
Internal Link Dist (m)		225.1		242.5			27.2		79.4
Turn Bay Length (m)	65.0		40.0		50.0			45.0	
Base Capacity (vph)	295	1477	314	1496	685		493	181	623
Starvation Cap Reductn	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.33	0.38	0.22	0.41	0.04		1.38	0.26	0.46

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 91 (96%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.38
Intersection Signal Delay: 71.8 Intersection LOS: E
Intersection Capacity Utilization 105.0% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Parkdale & Scott

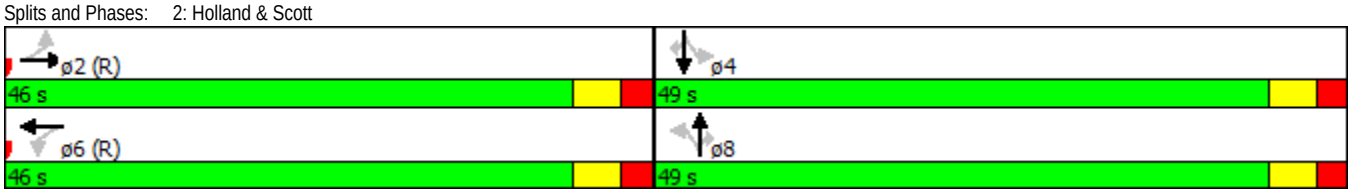


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	10	517	115	218	116	233	105	57	149	34
Lane Group Flow (vph)	0	638	121	274	122	245	111	60	157	36
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	36.8	36.8	36.8	36.8	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	46.0	46.0	46.0	46.0	49.0	49.0	49.0	49.0	49.0	49.0
Total Split (%)	48.4%	48.4%	48.4%	48.4%	51.6%	51.6%	51.6%	51.6%	51.6%	51.6%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		62.7	62.7	62.7	20.9	20.9	20.9	20.9	20.9	20.9
Actuated g/C Ratio		0.66	0.66	0.66	0.22	0.22	0.22	0.22	0.22	0.22
v/c Ratio		0.34	0.29	0.14	0.57	0.69	0.29	0.39	0.44	0.11
Control Delay		8.3	8.1	5.1	41.9	43.7	7.1	37.2	34.5	9.1
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		8.3	8.1	5.1	41.9	43.7	7.1	37.2	34.5	9.1
LOS		A	A	A	D	D	A	D	C	A
Approach Delay		8.3		6.0		34.7			31.5	
Approach LOS		A		A		C			C	
Queue Length 50th (m)		23.2	6.3	5.5	20.0	41.5	0.0	9.4	25.0	0.0
Queue Length 95th (m)		42.2	m12.8	m9.0	33.8	59.1	11.4	19.0	38.3	6.7
Internal Link Dist (m)		225.9		225.1		214.6			104.7	
Turn Bay Length (m)			120.0		50.0		35.0	45.0		45.0
Base Capacity (vph)		1879	423	1973	448	733	683	315	733	643
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.34	0.29	0.14	0.27	0.33	0.16	0.19	0.21	0.06

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 85 (89%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 18.3 — Intersection LOS: B
Intersection Capacity Utilization 70.4% — ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Holland & Scott



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	17	24	18	19	484	4	458
Lane Group Flow (vph)	0	58	0	51	0	549	0	491
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.2	22.2	22.2	22.2	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	27.0	27.0	73.0	73.0	73.0	73.0
Total Split (%)	27.0%	27.0%	27.0%	27.0%	73.0%	73.0%	73.0%	73.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9	1.9	1.7	1.7	1.7	1.7
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.2		5.2		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		21.8		21.8		68.0		68.0
Actuated g/C Ratio		0.22		0.22		0.68		0.68
v/c Ratio		0.17		0.15		0.46		0.41
Control Delay		24.7		29.6		8.1		8.3
Queue Delay		0.0		0.0		0.6		0.1
Total Delay		24.7		29.6		8.7		8.4
LOS		C		C		A		A
Approach Delay		24.7		29.6		8.7		8.4
Approach LOS		C		C		A		A
Queue Length 50th (m)		6.1		6.9		37.3		37.1
Queue Length 95th (m)		16.5		16.7		54.5		54.8
Internal Link Dist (m)		132.6		119.5		122.5		204.7
Turn Bay Length (m)								
Base Capacity (vph)		350		335		1181		1208
Starvation Cap Reductn		0		0		300		0
Spillback Cap Reductn		1		0		0		120
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.17		0.15		0.62		0.45

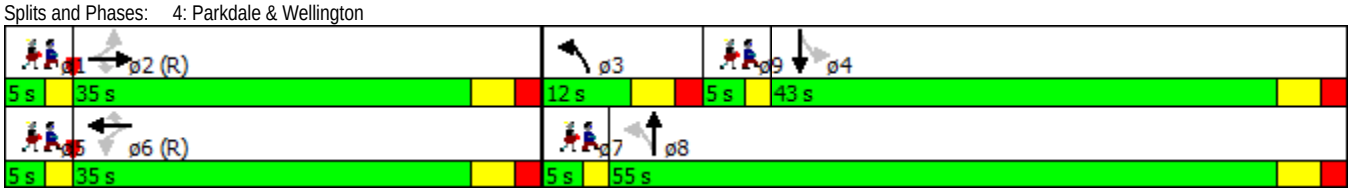
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 50	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 10.3	Intersection LOS: B
Intersection Capacity Utilization 58.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Parkdale & Armstrong

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	ø1	ø5
Lane Configurations												
Volume (vph)	20	187	60	16	108	11	40	217	36	527		
Lane Group Flow (vph)	0	218	63	0	131	12	42	246	38	593		
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA		
Protected Phases		2			6		3	8		4	1	5
Permitted Phases	2		2	6		6	8		4			
Detector Phase	2	2	2	6	6	6	3	8	4	4		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0	3.0	3.0
Minimum Split (s)	18.4	18.4	18.4	18.4	18.4	18.4	10.4	15.4	15.4	15.4	5.0	5.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	12.0	55.0	43.0	43.0	5.0	5.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	12.0%	55.0%	43.0%	43.0%	5%	5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		5.4	5.4		5.4	5.4	5.4	5.4	5.4	5.4		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag			Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		39.3	39.3		39.3	39.3	49.9	49.9	42.7	42.7		
Actuated g/C Ratio		0.39	0.39		0.39	0.39	0.50	0.50	0.43	0.43		
v/c Ratio		0.36	0.13		0.22	0.03	0.19	0.31	0.09	0.88		
Control Delay		25.3	22.7		23.2	21.9	13.2	15.2	17.1	41.7		
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0	0.0	10.9		
Total Delay		25.3	22.7		23.2	21.9	13.2	15.2	17.1	52.6		
LOS		C	C		C	C	B	B	B	D		
Approach Delay		24.7			23.1			14.9		50.4		
Approach LOS		C			C			B		D		
Queue Length 50th (m)		31.8	8.3		18.0	1.5	3.6	24.2	4.7	112.8		
Queue Length 95th (m)		52.3	17.7		32.3	5.3	8.4	39.0	12.0	#169.6		
Internal Link Dist (m)		37.0			13.5			115.8		122.5		
Turn Bay Length (m)			20.0			20.0	50.0		40.0			
Base Capacity (vph)		604	503		597	464	227	832	408	674		
Starvation Cap Reductn		0	0		0	0	0	0	0	70		
Spillback Cap Reductn		0	0		0	0	0	0	0	0		
Storage Cap Reductn		0	0		0	0	0	0	0	0		
Reduced v/c Ratio		0.36	0.13		0.22	0.03	0.19	0.30	0.09	0.98		

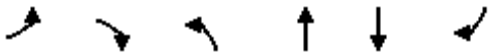
Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 34.5	Intersection LOS: C
Intersection Capacity Utilization 70.5%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 4: Parkdale & Wellington



Lane Group	ø7	ø9
Lane Configurations		
Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

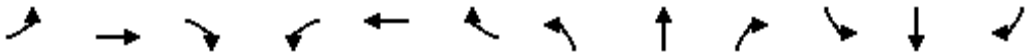
Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	18	18	8	656	386	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	19	19	8	691	406	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				298	51	
pX, platoon unblocked	0.93	0.88	0.88			
vC, conflicting volume	1117	410	414			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	850	257	261			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	97	99			
cM capacity (veh/h)	304	686	1143			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	38	699	414
Volume Left	19	8	0
Volume Right	19	0	7
cSH	421	1143	1700
Volume to Capacity	0.09	0.01	0.24
Queue Length 95th (m)	2.2	0.2	0.0
Control Delay (s)	14.4	0.2	0.0
Lane LOS	B	A	
Approach Delay (s)	14.4	0.2	0.0
Approach LOS	B		

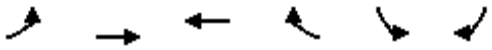
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	2	37	5	2	7	19	620	13	4	354	43
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	2	39	5	2	7	20	653	14	4	373	45
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								229			121	
pX, platoon unblocked	0.92	0.92	0.91	0.92	0.92	0.87	0.91			0.87		
vC, conflicting volume	1112	1110	395	1143	1126	659	418			666		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	850	848	282	884	865	537	307			545		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	99	94	98	99	98	98			100		
cM capacity (veh/h)	248	268	687	225	262	475	1137			894		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	79	15	686	422
Volume Left	38	5	20	4
Volume Right	39	7	14	45
cSH	363	314	1137	894
Volume to Capacity	0.22	0.05	0.02	0.00
Queue Length 95th (m)	6.2	1.1	0.4	0.1
Control Delay (s)	17.6	17.0	0.5	0.1
Lane LOS	C	C	A	A
Approach Delay (s)	17.6	17.0	0.5	0.1
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	61.3%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	18	45	19	57	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	19	47	20	60	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	67				76	57
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	67				76	57
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				94	100
cM capacity (veh/h)	1534				927	1009

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	19	67	60
Volume Left	0	0	60
Volume Right	0	20	0
cSH	1534	1700	927
Volume to Capacity	0.00	0.04	0.06
Queue Length 95th (m)	0.0	0.0	1.6
Control Delay (s)	0.0	0.0	9.2
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.2
Approach LOS			A

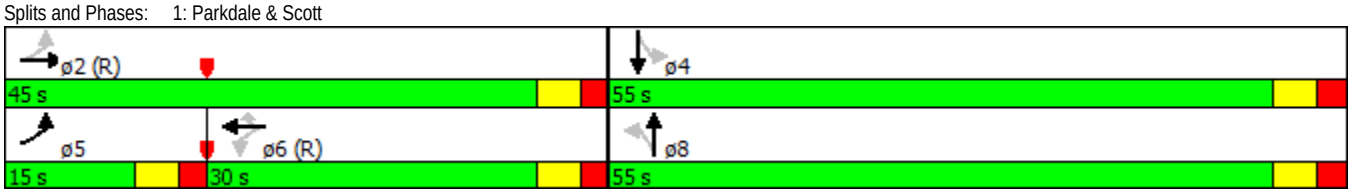
Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	13.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	142	559	142	448	47	151	427	14	425
Lane Group Flow (vph)	149	713	149	472	49	0	764	15	491
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		6		6	8		4	
Detector Phase	5	2	6	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	11.0	27.4	27.4	27.4	27.4	32.7	32.7	32.7	32.7
Total Split (s)	15.0	45.0	30.0	30.0	30.0	55.0	55.0	55.0	55.0
Total Split (%)	15.0%	45.0%	30.0%	30.0%	30.0%	55.0%	55.0%	55.0%	55.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.4	5.4	5.4	5.4	5.4		5.7	5.7	5.7
Lead/Lag	Lead		Lag	Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	Max	Max
Act Effct Green (s)	39.6	39.6	25.0	25.0	25.0		49.3	49.3	49.3
Actuated g/C Ratio	0.40	0.40	0.25	0.25	0.25		0.49	0.49	0.49
v/c Ratio	0.53	0.60	0.98	0.62	0.12		1.69	0.06	0.63
Control Delay	24.7	20.9	107.7	37.6	2.3		337.2	14.2	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	24.7	20.9	107.7	37.6	2.3		337.2	14.2	22.7
LOS	C	C	F	D	A		F	B	C
Approach Delay		21.6		50.6			337.2		22.5
Approach LOS		C		D			F		C
Queue Length 50th (m)	15.0	37.8	28.9	43.0	0.0		~156.6	1.5	66.2
Queue Length 95th (m)	25.4	49.5	#67.6	59.6	2.7		#198.2	5.0	99.8
Internal Link Dist (m)		225.1		242.5			32.2		79.4
Turn Bay Length (m)	65.0		40.0		50.0			45.0	
Base Capacity (vph)	286	1195	152	762	407		452	253	784
Starvation Cap Reductn	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.52	0.60	0.98	0.62	0.12		1.69	0.06	0.63

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 18 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.69
Intersection Signal Delay: 114.7 Intersection LOS: F
Intersection Capacity Utilization 126.2% ICU Level of Service H
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Parkdale & Scott



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	16	447	164	649	114	207	92	56	300	41
Lane Group Flow (vph)	0	560	173	712	120	218	97	59	316	43
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2		6		8			4	
Permitted Phases	2		6		8		8	4		4
Detector Phase	2	2	6	6	8	8	8	4	4	4
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	36.8	36.8	36.8	36.8	23.6	23.6	23.6	23.6	23.6	23.6
Total Split (s)	60.0	60.0	60.0	60.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.8	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		63.2	63.2	63.2	25.4	25.4	25.4	25.4	25.4	25.4
Actuated g/C Ratio		0.63	0.63	0.63	0.25	0.25	0.25	0.25	0.25	0.25
v/c Ratio		0.32	0.39	0.37	0.88	0.54	0.23	0.29	0.78	0.11
Control Delay		9.6	9.5	6.0	84.3	35.9	6.5	31.2	47.2	8.0
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		9.6	9.5	6.0	84.3	35.9	6.5	31.2	47.2	8.0
LOS		A	A	A	F	D	A	C	D	A
Approach Delay		9.6		6.7		42.7			40.9	
Approach LOS		A		A		D			D	
Queue Length 50th (m)		22.5	9.0	18.8	22.4	36.7	0.0	9.2	57.2	0.0
Queue Length 95th (m)		40.8	m17.7	m27.8	#45.3	51.9	10.4	18.1	76.8	7.1
Internal Link Dist (m)		225.9		225.1		214.6			104.7	
Turn Bay Length (m)			120.0		50.0		35.0	45.0		45.0
Base Capacity (vph)		1759	438	1919	186	552	533	280	552	497
Starvation Cap Reductn		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.32	0.39	0.37	0.65	0.39	0.18	0.21	0.57	0.09

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 2 (2%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 20.5 — Intersection LOS: C
Intersection Capacity Utilization 85.5% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Holland & Scott

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	32	70	31	59	36	657	13	440
Lane Group Flow (vph)	0	151	0	110	0	771	0	494
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	22.2	22.2	22.2	22.2	25.0	25.0	25.0	25.0
Total Split (s)	35.0	35.0	35.0	35.0	65.0	65.0	65.0	65.0
Total Split (%)	35.0%	35.0%	35.0%	35.0%	65.0%	65.0%	65.0%	65.0%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.9	1.9	1.9	1.9	1.7	1.7	1.7	1.7
Lost Time Adjust (s)		0.0		0.0		0.0		0.0
Total Lost Time (s)		5.2		5.2		5.0		5.0
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)		29.8		29.8		60.0		60.0
Actuated g/C Ratio		0.30		0.30		0.60		0.60
v/c Ratio		0.31		0.24		0.75		0.48
Control Delay		25.6		26.2		18.3		16.1
Queue Delay		0.0		0.0		2.1		0.1
Total Delay		25.6		26.2		20.4		16.2
LOS		C		C		C		B
Approach Delay		25.6		26.2		20.4		16.2
Approach LOS		C		C		C		B
Queue Length 50th (m)		19.4		14.8		117.9		49.9
Queue Length 95th (m)		35.8		28.5		173.3		m70.8
Internal Link Dist (m)		122.7		110.8		122.0		212.8
Turn Bay Length (m)								
Base Capacity (vph)		483		468		1022		1039
Starvation Cap Reductn		0		0		132		0
Spillback Cap Reductn		0		0		0		69
Storage Cap Reductn		0		0		0		0
Reduced v/c Ratio		0.31		0.24		0.87		0.51

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 20 (20%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 20.0	Intersection LOS: B
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

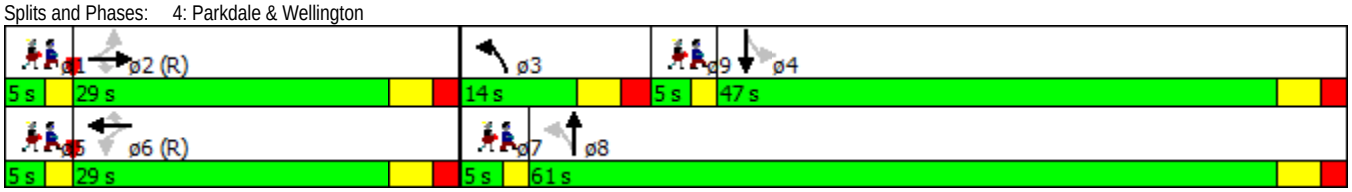
Splits and Phases: 3: Parkdale & Armstrong

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	ø1	ø5
Lane Configurations												
Volume (vph)	39	211	82	23	201	24	74	498	60	564		
Lane Group Flow (vph)	0	263	86	0	236	25	78	546	63	650		
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA		
Protected Phases		2			6		3	8		4	1	5
Permitted Phases	2		2	6		6	8		4			
Detector Phase	2	2	2	6	6	6	3	8	4	4		
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	5.0	10.0	10.0	10.0	3.0	3.0
Minimum Split (s)	18.4	18.4	18.4	18.4	18.4	18.4	10.4	15.4	15.4	15.4	5.0	5.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0	29.0	14.0	61.0	47.0	47.0	5.0	5.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	14.0%	61.0%	47.0%	47.0%	5%	5%
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.0	2.0
All-Red Time (s)	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	0.0
Lost Time Adjust (s)		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)		5.4	5.4		5.4	5.4	5.4	5.4	5.4	5.4		
Lead/Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag			Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Recall Mode	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max	None	None	None	None	None	None
Act Effct Green (s)		31.7	31.7		31.7	31.7	57.5	57.5	46.9	46.9		
Actuated g/C Ratio		0.32	0.32		0.32	0.32	0.58	0.58	0.47	0.47		
v/c Ratio		0.58	0.21		0.49	0.08	0.30	0.60	0.19	0.89		
Control Delay		36.2	28.7		33.4	27.3	11.6	16.4	14.9	34.3		
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.6	0.0	0.0		
Total Delay		36.2	28.7		33.4	27.3	11.6	17.0	14.9	34.3		
LOS		D	C		C	C	B	B	B	C		
Approach Delay		34.4			32.8			16.4		32.6		
Approach LOS		C			C			B		C		
Queue Length 50th (m)		44.5	12.7		38.6	3.6	5.8	58.6	5.6	65.6		
Queue Length 95th (m)		71.6	25.2		62.5	10.0	11.7	88.0	11.7	#182.1		
Internal Link Dist (m)		24.3			20.7			115.8		122.0		
Turn Bay Length (m)							50.0		40.0			
Base Capacity (vph)		455	412		482	301	270	948	330	734		
Starvation Cap Reductn		0	0		0	0	0	0	0	0		
Spillback Cap Reductn		0	0		0	0	0	140	0	0		
Storage Cap Reductn		0	0		0	0	0	0	0	0		
Reduced v/c Ratio		0.58	0.21		0.49	0.08	0.29	0.68	0.19	0.89		

Intersection Summary

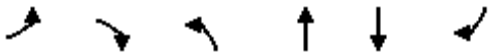
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 70 (70%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 27.7 — Intersection LOS: C
Intersection Capacity Utilization 91.0% — ICU Level of Service F
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Parkdale & Wellington



Lane Group	ø7	ø9
Lane Configurations		
Volume (vph)		
Lane Group Flow (vph)		
Turn Type		
Protected Phases	7	9
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)	3.0	3.0
Minimum Split (s)	5.0	5.0
Total Split (s)	5.0	5.0
Total Split (%)	5%	5%
Yellow Time (s)	2.0	2.0
All-Red Time (s)	0.0	0.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes
Recall Mode	None	None
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
Queue Length 50th (m)		
Queue Length 95th (m)		
Internal Link Dist (m)		
Turn Bay Length (m)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

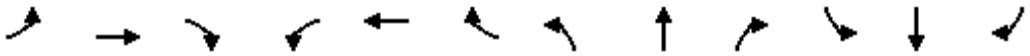
Intersection Summary



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	13	15	17	740	694	15
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	16	18	779	731	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				294	56	
pX, platoon unblocked	0.85	0.71	0.71			
vC, conflicting volume	1553	738	746			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	807	433	444			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	96	98			
cM capacity (veh/h)	293	445	797			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	29	797	746
Volume Left	14	18	0
Volume Right	16	0	16
cSH	358	797	1700
Volume to Capacity	0.08	0.02	0.44
Queue Length 95th (m)	2.0	0.5	0.0
Control Delay (s)	16.0	0.6	0.0
Lane LOS	C	A	
Approach Delay (s)	16.0	0.6	0.0
Approach LOS	C		

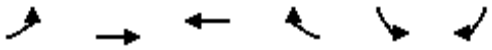
Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	36	4	24	7	5	8	34	711	7	5	652	49
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	38	4	25	7	5	8	36	748	7	5	686	52
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)								237			113	
pX, platoon unblocked	0.82	0.82	0.74	0.82	0.82	0.69	0.74			0.69		
vC, conflicting volume	1557	1550	712	1574	1572	752	738			756		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	856	847	436	876	874	411	471			417		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	98	94	96	98	98	96			99		
cM capacity (veh/h)	210	232	459	197	223	440	808			785		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	67	21	792	743
Volume Left	38	7	36	5
Volume Right	25	8	7	52
cSH	266	263	808	785
Volume to Capacity	0.25	0.08	0.04	0.01
Queue Length 95th (m)	7.5	2.0	1.1	0.2
Control Delay (s)	23.1	19.9	1.2	0.2
Lane LOS	C	C	A	A
Approach Delay (s)	23.1	19.9	1.2	0.2
Approach LOS	C	C		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	77.3%	ICU Level of Service	D	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	21	33	55	43	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	22	35	58	45	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	93				86	64
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	93				86	64
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				95	100
cM capacity (veh/h)	1502				915	1001

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	22	93	45
Volume Left	0	0	45
Volume Right	0	58	0
cSH	1502	1700	915
Volume to Capacity	0.00	0.05	0.05
Queue Length 95th (m)	0.0	0.0	1.2
Control Delay (s)	0.0	0.0	9.1
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	15.4%	ICU Level of Service	A
Analysis Period (min)	15		